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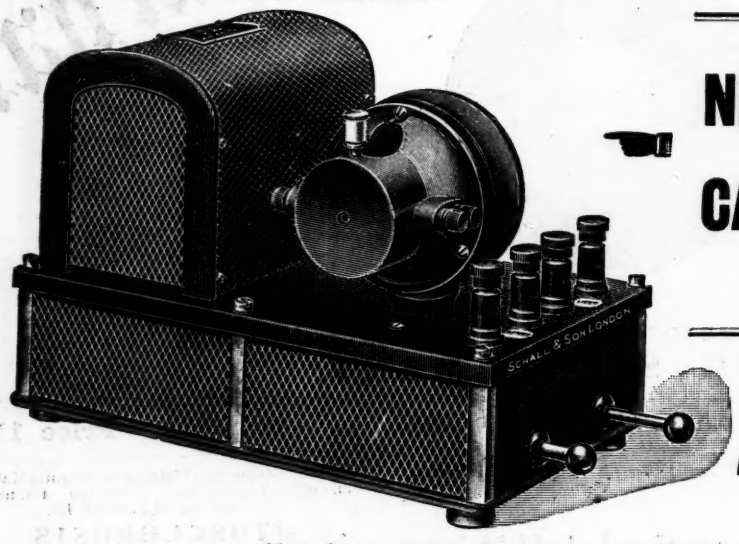

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DISCUSSION ON THE DIAGNOSIS OF THE NERVOUS DISORDERS OF THE STOMACH AND INTESTINE.

OPENING PAPER.
BY

ARTHUR F. HURST, M.A., M.D.Oxon., F.R.C.P.,
Physician and Neurologist to Guy's Hospital.

No more appropriate subject than the diagnosis of the nervous disorders of digestion could have been chosen for discussion at this meeting of the British Medical Association. For it was here in Cambridge that Gaskell did his pioneer work on the autonomic nervous system, and it is here that Langley has for so many years carried out his remarkable investigations, which have added such a wealth of detail to the foundations which had been so truly laid. And one of the earliest clinical contributions to the subject came from the pen of our revered President, the Regius Professor of Physic in the University of Cambridge, who in 1884 chose "Visceral Neuroses" as the subject of his Goulstonian Lectures.

For a discussion on such a wide subject as the diagnosis of the nervous disorders of the stomach and intestines to be profitable it is essential to stick to facts. Much of the traditional teaching dates from a time when knowledge of the physiology and anatomy of the stomach and intestines was very rudimentary, and clinical methods of examination were much less accurate than they are now; but it has kept its place in textbooks of medicine in spite of the failure of modern research to confirm it.

An attempt must first be made to gain a clear conception of what is meant by certain terms, such as functional, neurosis, psychoneurosis, neurasthenia, and hysteria. A functional disorder is one which does not depend upon organic change; it may be either biochemical or nervous in origin. Functional disorders of nervous origin, the only ones with which we are concerned to-day, are of two kinds—the neuroses, which are independent of mental processes, whether conscious or subconscious, and the psychoneuroses, which have a psychical cause. This distinction is of fundamental importance, as the psychoneuroses alone are amenable to psychotherapy.

Neurasthenia has generally been classified as a neurosis. But it really depends upon definite though evanescent organic changes in the central nervous system and in the suprarenal and possibly other endocrine glands, which result from mental and physical exhaustion and chronic intoxications. It is therefore an organic and not a functional disorder. As, however, the somewhat ill-defined condition, which has in the past been known as nervous dyspepsia, has been regarded as often if not always caused by neurasthenia, the relation of neurasthenia to the nervous disorders of digestion requires discussion.

The psychoneuroses can be broadly classified under the headings of hysteria and psychasthenia. Before the war I should have classed the tics separately, but I am now convinced that they are really hysterical. By hysteria I mean a condition in which symptoms are present which have been produced by suggestion and are curable by psychotherapy. During the war my fellow workers and I gathered together a great deal of evidence to show that in the absence of gross hysterical manifestations there is no underlying condition to which the name of hysteria can be given. We have confirmed Babinski's observations that Charcot's physical stigmata are invariably a result of suggestion on the part of the observer, and, what is more important, we are firmly convinced that although an abnormal degree of suggestibility predisposes to hysteria, it is not an essential part of it, and that hysteria may occur in individuals with a perfectly normal mental make-up. When this is once realized, it becomes clear that absence of the mental characteristics which lead to an individual being labelled as neurotic does not in any way exclude the possibility of the digestive or other disorder from which he is suffering from being hysterical, any more than it can be assumed that symptoms in a neurotic girl are not due to organic disease. It follows that a diagnosis can only be made from the nature of the symptoms and the results of physical and laboratory methods of examination.

I. NERVOUS DISORDERS OF THE STOMACH.
Nervous Dyspepsia; Atonic Dilatation of the Stomach; Hyperchlorhydria and Hypochlorhydria.

The traditional description of the nervous disorders of digestion depended upon false ideas of physiology and anatomy. It was, for example, assumed that a certain degree of tone and a certain activity of peristalsis were normal and that a normal stomach secreted juice of a certain strength. Any divergence from these standards, which were as a matter of fact often very vague, was regarded as evidence of disordered function. Such a condition as atonic dyspepsia, due to atonic dilatation of the stomach caused by deficient tone, associated with deficient peristalsis and secretion, and acid dyspepsia due to hypersecretion, were described, whilst the more scientific writers talked of hypochlorhydria and hyperchlorhydria as clinical entities. In addition to the motor and secretory neuroses, a sensory neurosis was recognized, in which indigestion was supposed to result from hyperaesthesia of the gastric mucous membrane. But my own investigations, which have been confirmed by numerous radiographers both in England and abroad, and the recent chemical investigations by fractional test meals, carried out by Reyfuss and Crohn in America and Ryle and Bennett at Guy's Hospital, have shown that such great variations occur in the muscular tone, peristalsis, and secretory activity of the stomach in normal individuals that it may well be doubted whether what is generally regarded as atonic dilatation, hyperchlorhydria, and hypochlorhydria do not really fall within the normal limits. This remains true even when the diagnosis is supported by an *x* ray examination and gastric analysis, but what can one say of the cases in which the diagnosis is made in their absence? I have seen so many doctors who believed that they had atonic dilatation of the stomach, but were found with the *x* rays to have hypertonic stomachs, and I have seen so many cases in which the symptoms pointed to hyperchlorhydria, but achylia was actually present, that I am quite certain that it is utterly impossible to form a reliable estimate of the muscular or secretory activity of the stomach from a consideration of the symptoms alone. The investigations I carried out with several Guy's students some years ago proved, moreover, that the theory of gastric hyperaesthesia has no basis in fact, as the mucous membrane of the stomach, both in health and disease, is entirely insensitive to tactile, thermal, and painful stimuli and to hydrochloric acid up to the maximum strength in which it could conceivably be present in the gastric juice.

The discovery of variations from the average normal tone, peristalsis and secretion in individuals with digestive symptoms is therefore no evidence that these variations are in any way responsible for the symptoms. The atonic dilatation and hyposecretion, which are supposed to be the cause of the dyspepsia of the exhausted neurasthenic, exist as a rule only in the imagination, as there is not the smallest evidence to show that true neurasthenia in any way affects the motor or secretory functions of the stomach. I can well believe that an exhausted individual, who happens to have a stomach the tone, peristalsis and secretion of which are below the average, will be more likely to suffer from indigestion than a man with an average normal stomach. His condition may be correctly described as neurasthenic dyspepsia, and he may benefit from treatment directed to increase the motor and secretory activity of his stomach, but it must be remembered that the neurasthenia is not the cause of the deficient tone and secretion, and that in the absence of the neurasthenia there would be no digestive symptoms,

although the deficient tone and secretion would still be present. Exhaustion may be the exciting cause of a different group of gastric symptoms in a man whose stomach is of the hypertonic, hypersecretory type, and these symptoms may be the herald of an attack of duodenal ulceration. But the hypertonus and hyperchlorhydria are congenital and not caused by the exhaustion or the duodenal ulcer which may ultimately develop; they simply predispose to a certain form of indigestion—the acid dyspepsia or hyperchlorhydria of the textbooks, which occurs as a result of various conditions, one of which is exhaustion.

It is clear from what I have said that there is little justification for retaining such terms as atonic dilatation of the stomach, hyperchlorhydria, hypochlorhydria, atonic and acid dyspepsia, as descriptions of clinical conditions. But we can separate two varieties of neurasthenic dyspepsia, which, however, can only be recognized with certainty with the aid of the *x* rays and gastric analysis: the atonic, occurring in an individual with a stomach with less than the average tone and secretion; and the hypertonic, occurring in one with a stomach with more than the average tone and secretion.

Hysterical Vomiting.

Hysterical vomiting has long been recognized, but the old view of the nature of hysteria led to the belief that it was a comparatively rare condition, which only occurred in neurotic females, who showed the so-called hysterical stigmata. I had begun to realize already before the war that this was too narrow a conception, but it was not until I saw the large numbers of otherwise healthy soldiers suffering from this condition that I realized how common it really was, and my experience during this last year has fully confirmed my expectation that it would prove equally common in civil practice. Hysterical symptoms result from suggestion: the suggestion which gives rise to hysterical vomiting is vomiting. Whether this is emotional in origin or due to gastric irritation, reflex action or toxaemia, auto-suggestion leads to its aggravation whilst the primary cause is still present, or its perpetuation after the latter has disappeared. To the auto-suggestion is almost invariably added the hetero-suggestion involved in treatment by dieting, drugs or other measures, which have been adopted or continued longer than necessary owing to want of recognition of the hysterical element in the case. Hundreds of gassed soldiers continued to vomit after the gastritis caused by the swallowing of irritant gas dissolved in the saliva had completely disappeared. We ultimately came to the conclusion that whenever vomiting persisted for more than a month after gassing it was certainly hysterical. In the same way vomiting caused by acute indigestion from food poisoning or food excess may continue after the irritant has been expelled from the stomach, and the persistent vomiting of young women, which was formerly regarded as due to gastric ulcer and more recently to chlorosis, is most frequently of this nature. The reflex vomiting of phthisis and chronic appendicitis are often greatly exaggerated by the addition of an hysterical element, and when vomiting persists after the removal of a chronically inflamed appendix, the condition is generally hysterical and not the result of hypothetical adhesions. An individual who has once been seasick and on his next trip across the channel lies down in the saloon with a basin by his side directly he gets on board, will certainly succumb to the mass suggestion afforded by his vomiting neighbours as soon as the ship sails.

The most important of all forms of hysterical vomiting, which has led to the death of many mothers and of still more unborn infants, is the so-called "pernicious vomiting of pregnancy." I have not yet seen a case in which immediate recovery did not follow psychotherapy. We have proved conclusively that the disturbed metabolism is due to starvation and dehydration and is not an indication of some obscure toxaemia.

I was recently asked to see a woman in the fourth month of pregnancy who since the third week had been unable to retain even fluids. She was extremely emaciated, her tongue was dark and dry, and her pulse rate was 160. Large quantities of diacetic acid were present in her urine, and the ammonia index, which measures the degree of acid intoxication, had risen from the average normal of 5 to 28, although 10 is the limit generally regarded as an urgent indication for emptying the uterus. I was convinced from past experience that the condition would prove to be hysterical, although arrangements had already been made to terminate the pregnancy. On cross-questioning her I discovered that when she began to vomit her father had said to her, "You will have a bad time of it, as your mother was sick all the time she was carrying you." I explained to her how this remark had acted as a suggestion, and how she would be able to retain ordinary food directly she was given it, as she would eat it with enjoyment, instead of drinking milk, which she disliked, as a matter of duty. She accepted this explanation at once, and when I returned later in the afternoon she was eager to put it to the test by having some tea and buttered toast. She took this in my presence, and kept it down without difficulty. She had more solid food for supper, and next day she had a good breakfast, and steak for dinner. She had vomited a little in the early morning, but with this exception she remained perfectly well. She took an ordinary diet, and gained 16 lb. in weight in four weeks; the ammonia index rapidly fell to the normal for pregnant women, and diacetic acid disappeared from the urine. There was a slight return of vomiting in the morning during the third week, but this was quickly controlled by further psychotherapy, and now, in the seventh month of pregnancy, she is still perfectly fit.

The diagnosis in cases of this kind is easy, as in the absence of obvious organic disease such as appendicitis, vomiting which begins early in pregnancy and does not cease at the end of six or eight weeks, is always hysterical.

Apart from pregnancy it should be remembered that severe pyloric obstruction is the only gastric disease which causes persistent vomiting. If this can be excluded, and if there is no fever, no headache, and nothing pointing to organic disease elsewhere in the abdomen, the vomiting is probably hysterical.

Flatulent Dyspepsia and Aërophagy.

We are, I think, often too ready to accept our patient's own diagnosis. He says he is suffering from flatulence, and we treat him with diet and antiseptic drugs for flatulent dyspepsia. But when we look more closely into the matter we find that the condition is almost invariably a psychoneurosis and can be rapidly cured by psychotherapy, although there may be a small organic basis requiring other treatment.

A patient with so-called flatulent dyspepsia complains of a feeling of fullness in the upper part of the abdomen, which he at once assumes is due to flatulence, by which he means an accumulation of gas, and which he probably assumes is a result of fermentation. But careful investigation has shown that fermentation very rarely occurs in the stomach, which empties itself too rapidly and secretes a juice which is too acid for any appreciable amount of bacterial activity to occur. Only in cancer of the pylorus, in which gastric stasis and deficient acidity are present together, can severe flatulence be really due to fermentation. In the absence of the characteristic symptoms suggesting this condition, which would call for further investigation with the stomach-tube and *x* rays, a complaint of flatulence can be assumed at once to be due to something else than fermentation.

Aërophagy is the only common cause of flatulence. The patient feels some slight discomfort in his stomach, which he thinks is due to wind, and which he hopes he will be able to "disperse" by eructation; as there is really no excess of gas present, the attempt proves unsuccessful, but results in the swallowing of air. After half a dozen or more attempts have been made without success, air being swallowed on each occasion, the stomach becomes so distended that an attempt is at last successful. Aërophagy is a psychoneurosis. In severe cases it persists long after the primary gastric discomfort has disappeared. It may, then, be regarded as a visceral tic, and, like all hysterical symptoms, it can be readily cured by pure psychotherapy.

The gas brought up in aërophagy is odourless and tasteless. There can be little doubt that aërophagy is present if eructation is frequently repeated, and no doubt at all if it occurs six or more times in rapid succession, as fermentation could not conceivably give rise to such a large quantity of gas. Eructation occurring before breakfast in the absence of pyloric obstruction is always due to aërophagy, as there is nothing in the stomach from which gas could be produced. The diagnosis can be confirmed by means of the *x* rays, with which it is easy to watch the whole process of aërophagy.

Occasionally a patient complains of flatulence, but says that he never brings any wind up, although he is much troubled with abdominal distension. It may at once be concluded that he is suffering from pseudo-flatulence, as if

excess of gas is in the stomach it can always be brought up without difficulty. In cases of doubt, the absence of any accumulation of gas can be confirmed with the *x* rays. Pseudo-flatulence may be caused by spasm of the diaphragm: a sensation of great distension is suddenly experienced, and the abdomen becomes so enlarged that the clothes have to be loosened. The distension disappears as suddenly as it came without eructation or passage of flatus; it also disappears under an anaesthetic and on firmly compressing the whole of the abdomen for some minutes. The *x* rays not only demonstrate the absence of excess of gas in the stomach, but also show the low position of the diaphragm and the absence of respiratory movements. This condition of hysterical spasm of the diaphragm was not uncommon in soldiers, especially after dysentery or colitis.

Psychasthenic Gastric Symptoms.

It is now recognized that many cases formerly regarded as neurasthenic are not really suffering from the result of exhaustion, their condition being of psychical origin and more accurately called psychasthenia. Though the chief symptoms are psychical, the uncontrolled emotions of the psychasthenic give rise to physical symptoms, amongst which may be disturbed action of the stomach and intestine, as would be expected from the physiological researches of Pavlov and Cannon, which have recently been extended by the observations on normal men by Bennett and Venables at Guy's Hospital. The most common gastric symptoms are a vague feeling of uneasiness or sinking in the epigastrium, anorexia and nausea; occasionally hysterical vomiting occurs as a complication. These physical symptoms may be a source of much distress to the patient, and not infrequently he consults a doctor about them without mentioning his more important mental symptoms unless pressed to do so. It is consequently of the greatest importance to get the patient's confidence and to learn every detail of his history—what worries he has, how he sleeps, whether he has nightmares, and whether he has any phobias or obsessions. If the symptoms do not correspond with any organic disease and no physical signs of disease are found on ordinary examination, and if the mental symptoms of psychasthenia are present, the digestive symptoms can generally be assumed to have the same origin, and no good can be done by further concentrating the patient's attention on his abdomen by test meals or *x*-ray examinations, although there is no doubt that the depressing emotions which are the cause of the symptoms inhibit to some extent both the secretory and motor functions of the stomach.

The only treatment required is psychotherapy; diet and drugs are useless, as the physical symptoms are merely the expression of a psychical disorder, which cannot be cured except by psychical means. Dr. T. I. Bennett will speak presently of the researches which are being carried out by himself, Dr. Ryle, and their fellow workers at Guy's Hospital, and Dr. R. G. Gordon will have more to say on the subject of gastric symptoms in psychasthenia.

II. Nervous Disorders of the Intestine.

Constipation.

It is comparatively rare for a patient to consult a doctor on account of constipation without having already attempted to cure himself with aperients. But no accurate diagnosis can be made until it has been ascertained whether the patient is really constipated at all. In my experience the symptoms generally ascribed to auto-intoxication caused by intestinal stasis are really produced by purgatives, which are, as Gulliver was told in his voyage to the Houyhnhnms, "equally annoying and disgustful to the bowels." They lead to the absorption of excess of toxic material, partly by hastening the half-digested contents of the small intestine into the caecum, where fermentation and putrefaction are consequently increased, and partly by causing the contents of the transverse, descending, and pelvic colon to be fluid instead of solid, so that absorption of toxins takes place throughout the length of the bowel instead of in the caecum and ascending colon alone.

In spite of his probable protests the patient should be instructed to see what happens if no drugs are taken for a week, an effort being made to open the bowels each morning. In most cases he quickly loses his abdominal pain and his so-called toxic symptoms. The bowels are often opened daily, in which case a diagnosis of *hysterical pseudo-constipation* can be made—hysterical because the patient had suggested to himself as a result of faulty education combined with the reading of pernicious advertisements that he was constipated and required aperients to keep himself well, whereas a little psychotherapy in the form of explanation of the physiology of his bowels and the origin of his symptoms, and persuasion to try to open his bowels each morning without artificial help, results in a cure. In many cases, however, the patient does not succeed in opening his bowels, although he may feel more comfortable than when he was taking drugs. A further abdominal and rectal examination should now be made. If no sign of organic disease is present, and if, as is generally the case, no accumulation is felt in the abdomen, the rectum will be found to be filled with faeces, which are in some cases stony hard, but in others quite soft, proving that there is no delay in the passage through the intestines. In spite of this the patient has no desire to open his bowels, although a normal individual would feel an urgent call to defaecation under such conditions. In 1908 I called this condition of inefficient defaecation dyschezia, to distinguish it from true intestinal stasis, in which there is delay in the colon. The majority of cases of dyschezia, which is the commonest form of severe constipation, are of nervous origin. They are caused by neglect to respond to the call to defaecate owing to laziness, insanitary conditions of the w.c., or false modesty. The rectum gradually dilates, so that an increasing quantity of faeces is needed to produce the adequate internal pressure required to give the sensation of fullness, which is the natural call to defaecation, and finally the sensation is lost completely. But the patient is still capable of emptying his rectum if he tries. He has, however, so convinced himself that he cannot get his bowels open unless he takes enemata, or such enormous doses of aperients that the fluid faeces practically act as enemata. He thus suggests to himself that his rectum is powerless to act by itself, true hysterical dyschezia being thus produced. In many cases no treatment is required beyond explaining to the patient the nature and cause of his condition and persuading him to make an effort to empty his rectum, which he must realize is really quite capable of doing its work, but occasionally it is also necessary to re-educate his rectum with graduated enemata.

In severe cases it is advisable to examine the intestinal functions with the *x*-rays, a barium meal being given after the patient has discontinued taking his aperients. The time table I gave ten years ago for the passage of food along the alimentary canal was nothing more than the average taken from numerous records obtained with the *x*-rays, but it has unfortunately often been regarded as representing the normal standard, the slightest variations from which indicated the presence of intestinal stasis. The fallacy of this has often been pointed out, as the normal limits are very wide, but I still frequently see patients who have been advised to submit themselves to colectomy or other drastic treatment as a result of an *x*-ray examination which showed a somewhat slow passage, which was, however, well within the normal. It is therefore necessary once again to describe briefly what evidence is required in order to diagnose stasis in different parts of the intestinal tract.

Ileal stasis should only be diagnosed if no trace of barium has reached the caecum six hours after the opaque meal, or if a considerable quantity of barium-containing chyme is still in the end of the ileum nine hours after the meal, if the stomach is known to have emptied itself in three hours. If most of the barium is still in the caecum and ascending colon at the end of twenty-four hours, they are the seat of stasis, even if a little has passed to the more distant parts of the colon, but a faint shadow of the caecum is often visible in normal individuals even three days after the meal. If the splenic flexure is reached in twenty-four hours, and the greater part of the barium is in the transverse colon at the end of forty-eight hours, there must be stasis in the transverse colon. Lastly, if at the end of twenty-four hours the greater part of the barium has collected in the pelvic colon or rectum or both, and in spite of this no desire to open the bowels is felt, dyschezia can be diagnosed.

Apart from dyschezia the only common form of constipation of nervous origin is that resulting from anorexia. Anorexia is a common symptom of both neurasthenia and psychasthenia, and the deficient stimulation of the intestine which it causes generally leads to a slow

passage through the whole colon. Intestinal activity is also likely to be inhibited by depressing emotions in psychasthenia. There is, however, no evidence to show that the nerve exhaustion of neurasthenia has any influence on the bowels. I am convinced that no such thing as atonic constipation exists, for tone and peristalsis are independent functions; and whereas deficient peristalsis is a common cause of constipation, the *x* rays have proved that atony of the colon is a rare condition, generally organic in origin, and not necessarily associated with any disturbance in peristalsis.

Intestinal Hypochondriasis.

When a patient complains of auto-intoxication and intestinal stasis, gravely discusses the question of kinks and adhesions, and produces a diary in which every action he passes is minutely described, the diagnosis of intestinal hypochondriasis is obvious. The medical profession is, I fear, largely responsible for this common nervous disorder, as these terms are employed too thoughtlessly, for the conditions they refer to are all rare and can only be diagnosed after a most thorough investigation. If this proves negative, the patient must be taught that his auto-intoxication is a result of drugging, that intestinal stasis in moderation is a virtue, as it promotes digestion and absorption of his food, and that we all have kinks and adhesions, and so long as they remain in the abdomen and do not get on the brain they do not really matter. No man knoweth his own bowels; what is a good action for one is a poor thing for another, and the sufficiency of a stool should be judged by the comfort felt after it has been passed out and not by its size, its shape or its consistence. He alone is happy and devoid of that most trying of the nervous disorders of the bowel—hypochondriasis—who follows Sir James Goodhart's admirable advice to do as the dogs do and never look behind him.

Nervous Diarrhoea.

When a patient complains of frequent actions of the bowels his stools must be examined before a diagnosis of diarrhoea can be made. What is called diarrhoea by the patient is often the frequent passage of small scybala, and the most common cause of this is dyschezia, the condition being due to rectal retention with overflow. The passage of a little mucus with hard lumps of faeces is of no importance, as mucus is the natural lubricant of the bowel and is secreted whenever hard faeces are retained in the rectum or pelvic colon. But if mucus or blood is present with soft or liquid stools, colitis, either primary or secondary to a growth, can be diagnosed with certainty. When, however, in a case of chronic diarrhoea, neither mucus nor blood is present, and the toxaemia of Bright's disease and Graves's disease can be excluded, the possibility of a nervous origin requires consideration. The colon is not in constant activity like the stomach and small intestine, and its movements are very rarely seen during an *x*-ray examination. Its whole motor activity is confined to a small number of powerful peristaltic waves each day, which travel along the greater part of its length.

In 1913 I found with Alan Newton that this "mass peristalsis" very rarely occurs except as a result of the gastro-colic reflex excited by taking food into the stomach. It is exaggerated in certain individuals to such an extent that, in addition to passing a solid stool on getting up in the morning, they have diarrhoea after breakfast and also after their other meals. This nervous diarrhoea is a pure neurosis, and can only be overcome by the regular use of minute doses of drugs which have the power of damping down the reflex. In most cases, however, it becomes exaggerated owing to the patient's absorption in his fear that he will have diarrhoea at inconvenient moments. A dinner party becomes an impossibility for him, and he gradually becomes more and more of a recluse. At this stage psychotherapy is required to overcome the psychical element which has developed on the top of the neurosis.

The bowels seem to be so little under voluntary control that I doubted for a time whether nervous diarrhoea could ever be regarded as hysterical. But C. H. Ripman had a soldier under his care at Seale Hayne Hospital with severe nervous diarrhoea of nearly two years' duration, which he cured at a single sitting by direct suggestion under hypnosis. As there was no doubt about its origin as a result of suggestion, it fulfilled the conditions required for a diagnosis of hysteria, having been caused by suggestion and cured by psychotherapy.

But a diagnosis of hysterical diarrhoea is not enough. The ultimate object of diagnosis is to gain a basis for rational treatment. It is therefore necessary in each case to discover what is the nature of the suggestion which has caused the diarrhoea. Careful cross-examination will generally reveal some definite cause. In most cases the original attack of diarrhoea was emotional in origin, over-activity of the bowel being one of the rarer of the many physical symptoms of emotion. When diarrhoea has once resulted from an emotion, any repetition of the emotion, even in a much slighter or modified form, or anything reminding the patient either consciously or subconsciously of the event which gave rise to the emotion, is likely to suggest a recurrence of the diarrhoea. This pure psychoneurosis may also occur as a complication of the exaggerated gastro-colic reflex I have already described, the bowels becoming so much a plaything of the patient's emotions that any important engagement, and not merely engagements for meals, and finally excitement of any kind, will lead to diarrhoea.

Muco-membranous Colitis.

Muco-membranous colitis is a condition in which constipation is associated with the constant or intermittent passage of membranes of coagulated mucus and with attacks of pain. I do not speak of mucous colitis, for there is no colitis without mucus, and the expression should therefore be discarded. The accumulation of hard faeces in the colon of individuals with an irritable nervous system may lead to reflex spasm of the intestinal muscles and reflex secretion of mucus. The latter remains so long in contact with the mucous membrane before it passes on that it has time to be coagulated by mucinase, a slowly acting ferment present in the mucous membrane; it thus forms thin membranes which are passed either with the stools or separately.

But it is not sufficient to find these membranes in the stools of a constipated patient to diagnose muco-membranous colitis, as they may also be passed in certain organic diseases, the most common of which is a growth of the pelvic colon. A careful investigation of the abdomen is therefore necessary, and this should include a sigmoidoscopic examination, as many cases of cancer of the pelvic colon can be diagnosed in no other way. I would ask you to regard the sigmoidoscope as an instrument which the practitioner and physician should learn to use as well as the surgeon. It is perfectly safe in careful hands if no anaesthetic is given, and after a little experience, which teaches one to dispense with inflation, it can be introduced without causing pain. If no growth is discovered the mucous membrane is generally found to be perfectly healthy in appearance; there is really no colitis present at all beyond the slight catarrh caused by the irritation of retained faeces, and corresponding with this the membranous shreds of mucus are found microscopically to contain few if any leucocytes. If, however, the patient has been treated with large intestinal douches of irritating fluid, some inflammation is generally present, just as the exactly analogous condition of the bronchi in asthma may be complicated by bronchitis caused by the inhalation of irritating fumes. When, therefore, muco-membranous colitis is not associated with organic disease, it may be regarded as a neurosis, and as it is most likely to occur in exhausted individuals, whose nervous system has become abnormally irritable, treatment is required for the exhaustion and for the constipation. Unfortunately there is a great tendency for the neurosis to develop into a psychoneurosis, and here again we are, I fear, ourselves largely to blame. So long as the patient does not know she is passing mucus she is comparatively well, but when she once knows, and still more when a course of Plombières treatment has made her a connoisseur in faeces, a mental element is added, which it is often difficult to remove. I know of few sadder spectacles than the bedridden young woman, the only child of a widow, whose life is devoted to keeping up her daughter's reputation as an intestinal martyr. But get her away from her parent, her purges and her Plombières, and she will soon be free from her psychoneurosis; the muco-membranous colitis, the pure neurosis, may still be present, though it requires but little treatment beyond wholesome neglect.

In these introductory remarks I have endeavoured to describe how the more important nervous disorders of the stomach and intestine can be recognized. At the same time I have shown how much would be gained by boldly discarding the traditional teaching in so far as it was founded on theory and not on facts. This discussion will, I think, be most fruitful in results if it leads to a satisfactory classification of gastric and intestinal neuroses based on observed facts, as this alone will give us the data required to diagnose when a disorder of digestion is nervous in origin, what is the nature of the underlying nervous condition, and to what disturbances in function it has given rise.

T. IZOD BENNETT, M.B.Lond.

WITH the assistance of a large number of medical students, Dr. Ryle and I have, during the past year, been investigating the whole question of gastric digestion by means of the fractional test meal method. This method, which has been largely employed by Rehfuss, Crohn, and Reiss in America, consists in withdrawing samples at quarter-hourly intervals from the stomach of the subject by means of the Einhorn tube, which I show you here. Samples are taken until the stomach is empty, each is then titrated, and a continuous curve showing the free hydrochloric acid and total acidity, together with the rate of emptying of the stomach, is obtained. Our investigation is on an extensive scale, and includes an *x*-ray examination of every case, the collection of family histories, diet diaries, etc.

From the outset it was apparent that much investigation of the normal healthy individual was required; I have obtained curves of seventy healthy students, and am going to continue the research until fully 100 have been examined. At the present moment certain conclusions can already be made; the first is that an estimation of gastric acidity made at any single moment after a test meal is, by itself, often grossly fallacious. It is relatively of no more value than would be an observation of one single point in the cardiac cycle on a polygraph tracing. For instance, in Fig. 1 are plotted the curves from three individuals; a single estimation made an hour after the meal would give a reading of 0.054 per cent. of free hydrochloric acid; and yet a glance at the complete curves demonstrates that these three individuals belong, one to the average normal group, one to a group marked by rapid emptying, and the third to a group at present classed as "hyperchlorhydria."

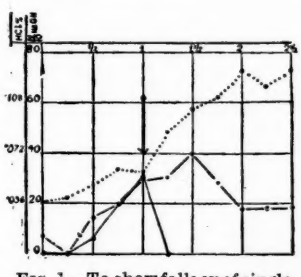

FIG. 1.—To show fallacy of single estimation one hour after test meal.

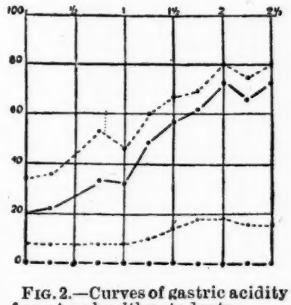

FIG. 2.—Curves of gastric acidity from two healthy students.

The second conclusion we have formed is that the terms "hyperchlorhydria" and "hypochlorhydria" as signifying pathological entities must be abolished; both occur frequently in healthy subjects. In Fig. 2 I show the curves of acidity of two healthy medical students; one you saw on the last chart; it is a marked "hyperchlorhydria"; the other is the extreme degree of hypochlorhydria in which HCl is entirely absent described as achylia gastrica. But whilst such extremes occur not infrequently, it is possible to establish a normal average curve; in thirty-eight of the first fifty students examined the curves corresponded closely to this average type; six, representing 12 per cent., come into the category "hyperchlorhydria," and seven, or 14 per cent., may be called "hypochlorhydria." There is no sharp line of demarcation between the groups; I have plotted their free acid in contrast in the following figure (Fig. 3).

The next fact to which I wish to draw attention is that profound changes in the physiological gastric cycle may be caused by emotive disturbances. It occurred to me that the effect of the emotions might well be demonstrated by the aid of hypnotism, and in this section of the work I have received the most able assistance of Dr. J. F. Venables, of the Neurological Department of Guy's Hospital. Helped by several enthusiastic volunteers from

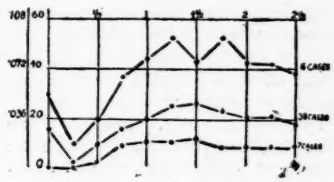

FIG. 3.—Average free HCl of the three normal groups contrasted.

FIG. 4.—Effect of suggestion hunger.

amongst the students, we have hypnotized a number of subjects during the course of test meals, and have then made varying suggestions to them. In Fig. 4 is a demonstration of the effect of suggested hunger; free HCl only is plotted, and it will be seen that the suggestion, which lasted less than half an hour, caused the acid percentage to rise sharply to 50 c.cm. N/10 NaOH with a subsequently rapid fall, whilst the rate of emptying was reduced by half an hour. In Fig. 5, on the other

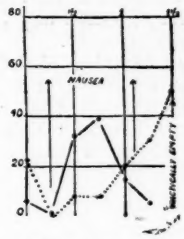

FIG. 5.—Effect of suggestion nausea.

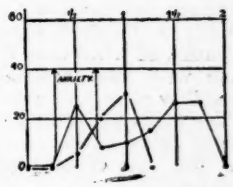

FIG. 6.—Effect of suggestion anxiety.

hand, is the effect of suggested nausea; the subject is a man whose normal gastric cycle is a rapid one, the effect of the emotion has been to delay the appearance of the free HCl for a very long time, whilst emptying of the stomach was made far slower.

The final curve (Fig. 6) was made a few days ago; the subject, an ex-officer of the Royal Flying Corps, was told, under hypnosis, to imagine himself again flying, and to be about to attempt a landing in difficult country in a failing light. The effect of the suggestion, anxiety, working through the sympathetic system, is very beautifully seen; even more marked than the alteration in the acid curve is the slowing of emptying, which is delayed to twice its normal time.

I have many other curves, showing anger, satisfaction, and other emotions, but the work is still in the incomplete state, and I do not wish to bring before you suggestions which are not yet fully proved.

THOMAS R. BROWN, M.D.,
Baltimore.

I AM a little embarrassed at being called upon, unexpectedly and therefore quite unprepared, to discuss Dr. Hurst's brilliant paper, for I had come to Cambridge to listen, not to speak; to learn, not to teach. Last night your "Grand Old Man of British Medicine," Sir Clifford Allbutt, who, with my old chief, Sir William Osler, I have always regarded as the leaders of medical thought in the Anglo-Saxon world, told us of the new currents in medicine, sketched its great future, sounded the note of danger of ultra-specialization in various fields, notably in that of psycho-analysis. To-day Dr. Hurst has taught us anew the interdependence of bodily symptoms and systems, the difficulty of depending upon concrete individual findings, and the need of a particular catholicity of judgement in the subject which he has presented to you—the diagnosis of the nervous disorders of the stomach and intestines. No one is better qualified than he to talk upon such a subject, for his reputation rests almost, if not quite, as much upon his neurological as upon his gastro-enterological contributions to medicine, and we in America have

been greatly helped and stimulated by his work in both fields. With many points of his discourse I heartily agree—for example, his belief that the majority of cases of constipation simply represent a pernicious habit or are due to the abuse of drugs, that dyschezia is a real clinical entity, that secretory findings should always be taken *cum grano salis*. Anyone who has performed animal experiments on the gastric secretion, or has had an opportunity of studying the gastric picture in human beings with a permanent or transitory gastric or intestinal fistula, usually, of course, of operative origin, realizes, on the one hand, the marked influence of the psyche upon these secretions, and on the other how really wrong the terms "hyperchlorhydria" and "hypochlorhydria" are, as, if we can depend upon such studies, gastric juice as secreted by the stomach is of almost constant acidity, although hyper- or hypo- or ano-secretion may give rise to the pictures which are generally recorded as increased or diminished or absent acidity.

With this undoubted dependence of the secretory picture upon the emotional state of the patient, with the recognized fact that the normal curve of secretion differs very markedly in different absolutely healthy individuals, and that the undoubted influence, be it mechanical or be it psychical, of the newer forms of tubes used which remain constantly in the stomach during investigation, must play some rôle in the secretory curve, we have always felt that all we can honestly expect from our secretory studies in a case—studies which undoubtedly must always be repeated to be of value—is in telling us in a very general way the secretory *tendencies* of the individual under study.

With a finished clinician such as Hurst a definite diagnosis of a nervous disorder of the digestion may be made with the practically complete elimination of all possibility of organic cause, but to those less well trained in the fields of general and special diagnosis attention may be called to the fact that before one definitely states that the case is of purely nervous origin it is well to consider—

1. The importance of a most thorough and complete general examination with all the means at our command because of the frequency with which digestive symptoms are encountered in diseases of other systems, such as, notably, the renal or cardio-vascular system, the thyroid and other glands of internal secretion, or the gall bladder, and of how purely gastric symptoms may be the only picture of an intestinal disorder and vice versa.
2. The fact that every gastro-intestinal lesion is associated with more or less functional disturbance, and that obviously the degree of this functional disturbance is largely dependent upon the relative sensibility of the nervous system of the patient.
3. The absolute disproportion, especially in the last mentioned group, between the existent organic lesion and the functional response, and the consequent necessity, even if the organic lesion is diagnosed and corrected, to follow this with the proper treatment for the functional derangement, which may last long after the organic cause has been removed.

It has always been very helpful to me in studying cases in this field to regard the digestive system as being under the influence of two sets of nerves fundamentally antagonistic in their action—the sympathetic and the vagus—and to realize that when this balance is broken up, either because of reflex stimulation from other parts of the digestive tract, or from other organs or tissues which are not functioning normally or which are organically diseased, or from an irritable or asthenic state of the nervous system, or from disturbances in the emotional sphere, we may meet a variety of digestive symptoms dependent upon the various factors previously mentioned; and finally, to recapitulate, that while the nervous disorders of digestion may be cured by encouragement and suggestion, and even the functional disturbances associated with organic lesions be markedly helped by such treatment, it is only after complete, thorough, and exhaustive physical examination that we are justified in diagnosing cases as nervous disorders of the stomach and intestines and of treating them accordingly.

W. Langdon Brown, M.D., F.R.C.P.,
London.

Recent improved methods of investigation have shown: (1) That conditions supposed to be neuroses may really be organic. Thus I have had cases presenting the symptoms constituting enteralgia, but which, as the result of combined examinations for occult blood in the stools, diastase in the urine, and by *x* rays, were shown to be due to duodenal ulcer burrowing into the pancreas. The diagnosis was confirmed in some cases by operation, and, unfortunately, in others by *post-mortem* findings. Yet the attacks were very unlike duodenal ulcer, and in some instances had been diagnosed as enteralgia. (2) That conditions supposed to be organic may really be purely functional. I would mention atonic dilatation of the stomach as an example of this; it used to be considered that this condition was secondary to gastritis. Gastritis is a comparatively rare disease, though the tendency to diagnose it has been much increased by the fact that it is one of the few digestive diseases a soldier was allowed to have. I can assert positively that the test meal in several such instances, far from being that of gastritis, showed marked hyperchlorhydria. I have seen dilatation, as proved by *x*-ray examination, come on and pass off coincident with the onset or the passing off of a mental strain. Fatigue is known to delay the emptying of the stomach, and if there is any tendency to atonic dilatation this will greatly increase it. Recently I saw a man who, in addition to heavy business duties, had his night's rest incessantly disturbed by the illness of his wife. His stomach was greatly dilated, and I removed by the tube more than a quart of foul-smelling gastric contents with an acidity as high as 0.3 per cent. Yet this man, when away during a visit to Holland, free from business worries and getting undisturbed nights, was able to eat and drink anything he wished without discomfort. (3) That a very slight organic lesion may provoke an unduly violent response if the nervous arc be unduly irritable and unstable. This is well shown in reflex dyspepsia, where hyperchlorhydric symptoms are induced by a lesion outside the stomach. Some such lesions are severe enough to produce symptoms, however stable the nervous system, such as duodenal ulcer. But other lesions, particularly in the ileo-caecal region, as Craven Moore points out, may cause no symptoms unless and until the susceptibility of the nervous arc is greatly exaggerated. It is therefore difficult to exclude an organic basis altogether. As Dr. Hurst has shown in other organic lesions, functional symptoms may be superadded, and this is true of the digestive system.

The point to which I want to direct attention is the nervous mechanism by which these functional disturbances are brought about.

The visceral or vegetative nervous system was defined by Gaskell as composed of two main divisions—the sympathetic and the parasympathetic. The sympathetic is katabolic, reducing potential energy to kinetic, defensive in its manifestations and interacting closely with the thyroid, pituitary, and adrenals. The parasympathetic is anabolic, leading to storage of reserves and associated with the activity of lymphoid structures throughout the body. Eppinger and Hess have tried to distinguish two types of neurotics—the sympathicotonics and the vagotonics—in which one or other of these divisions reacts unduly to stimulation. The skin of the vagotonic, according to them, shows dermographia and a tendency to urticaria and other skin eruptions; his lymphoid tissues tend to hypertrophy, his blood to show eosinophilia, and there is a liability to anaphylactic shock. Laryngeal spasm, respiratory arrhythmia, bradycardia, low blood pressure, increased gastric tonicity, hyperchlorhydria, spastic constipation, would all be produced through an over-sensitive vagus.

Without accepting all Eppinger and Hess's conclusions, I think I have been helped in diagnosis by looking for other vagotonic signs in a patient apparently suffering from functional dyspepsia, and, if they are present, giving him belladonna whatever other treatment is employed. Speaking generally, irregular and exaggerated contractions in the form of colic or tenesmus are due to irritation of the parasympathetic, whereas tonic spasm and atony are both due to sympathetic irritation—spasm due to constriction of the sphincters, and atony due to inhibition of normal movements. These two are frequently if not generally associated. With atonic dilatation of the stomach there may be pyloric spasm. Nor does this spasm merely assert itself in the sphincter below the irritable focus; it may occur in those above. Keith has likened the alimentary tract to a railroad divided into block sections, each provided with its signalman and telephonic apparatus. The signalman of one section refuses to accept any further traffic until his section is clear; all the sections are closely

correlated. If one is blocked the others, too, become automatically blocked. This would explain the widespread results of visceroptosis and the effect of sympathetic inhibition upon it.

Although we know that the conditions which produce visceroptosis are generally congenital, we also know that it need produce no symptoms until the patient has suffered from (*a*) debilitating illness, or (*b*) nervous shock. In the former instance the atony of the intestinal muscles increases the drag of the contents on the mesentery; in the latter the sympathetic inhibition of those muscles would produce the same effect. A vicious circle is thereby at once set up, for, as Tyrrell Gray showed, the drag on the mesentery sets up further sympathetic inhibition, increasing the stasis, which increases the dragging in its turn. We can thus understand the close association between visceroptosis and nervous symptoms, and the difficulty in deciding which factor was really primarily responsible. That nervous factors may predominate is shown by the marked improvement which follows the happier psychic state induced by a definite object or occupation in life.

May I refer in conclusion to a point on which I think the profession too often feed the imaginings of the neurotic—I mean an unduly rigid diet. The patient clamours for some special diet, and is dissatisfied unless he gets it. Consequently, he frequently gets one which is physiologically unsound. It impairs his nutrition and helps to increase his obsessions as to his digestive incapacity. This attitude should be discouraged. Restrictions should only be ordered for some definite reason. Here, as elsewhere, we must follow the maxim that if our treatment does the patient no good, we must at least see that it does him no harm.

H. TYRRELL GRAY, M.Ch.Cantab., F.R.C.S.,
London.

I APPRECIATE the honour of being invited to this discussion no less than I welcome the opportunity of learning directly the views of my medical colleagues on a group of visceral disorders in which frequently I feel the need of their help and co-operation. It is only natural that I should approach the subject under discussion from a somewhat different standpoint; and I feel sure you will not be too critical of my ignorance of some of the aspects of the far-reaching problems involved, particularly when these do not immediately concern my own particular line of study.

It is important to realize that the motor mechanism of the different regions of the alimentary tract is adapted to the character of the contents. Langdon Brown emphasized the fact that the nervous excitation of secretion gradually gives way to the chemical; and a similar gradual change, as the voluntary mechanism imperceptibly merges into the involuntary, is noticeable in the motor mechanism. Conditions are not necessarily analogous in different situations; thus, in regions where the contents are solid and semisolid, I believe the mechanism to differ from that in the regions where the contents are fluid.

As the voluntary or conscious mechanism gradually merges into the involuntary, the corresponding establishment of a dual nerve supply is to be noted—the sympathetic and parasympathetic—the one inhibitory and the other motor in function. The point at which the sympathetic enters into its inhibitory function is doubtful; but, on clinical grounds, I believe that it only innervates the pyloric half of the stomach musculature onwards—that is, from that point where the peristaltic waves normally commence. If this is correct, it is a point of considerable importance. These two nerve systems are associated with two entirely different varieties of gastro-intestinal movement. The parasympathetic (vagus and pelvic visceral nerves) terminating in Auerbach's plexus, excites or exaggerates the normally continuous rhythmic waves.

The sympathetic is purely inhibitory to intestinal contractions, except at the sphincters; and on this innervation I believe depends the mechanism of the peristaltic wave. With the details and functions of these two types of gastro-intestinal movement I need not now weary you; but I do wish to emphasize the importance of a clear differentiation between the two in the study of visceral disorders: a failure in this respect is, I believe, responsible for much confusion of thought. It is clear that interference with the motor functions of the gastro-intestinal tract may be effected in several ways through the alteration of the normal balance of nerve impulses reaching the viscera from these two sources; that is:

(*a*) By a relative increase of the parasympathetic impulses, or a relative decrease of the sympathetic. Either of these will conduce to exaggerated contraction and diminished inhibition of the intestinal muscle and may lead to intermittent obstruction by enterospasm.

(*b*) By a relative diminution of parasympathetic impulses leading to diminished rhythmic waves and consequent delayed or imperfect peristaltic excitation; or to an increase of sympathetic stimuli leading to gastro-intestinal inhibition.

It is the latter (*b*) with which we are especially concerned in the present discussion; and of these the increase of sympathetic nerve impulses plays the most important rôle, since it is so pre-eminently through the efferent sympathetic that impulses from the higher centres exert their influence on the vasomotor and visceral systems. Amongst disorders due to a diminution of normal parasympathetic impulses I should be inclined to class, though with some diffidence, the intestinal distension and constipation associated with paraplegia, Hirschsprung's disease, etc.

Now the psychical influence on the function of stomach and intestines is familiar to all of us clinically, though I confess I am not personally in a position to appreciate fully the niceties of classification presented to us in the opening address. Also, on general principles, it must be conceded that, as in all medicine and surgery, treatment directed to the primary cause should be capable of effecting a cure or at least an improvement. So that if a visceral disorder can be traced to a psychical origin, presumably psychotherapy should be capable of effecting a cure. But I would submit that investigation must be carried much further than the mere classification according to origin, if the true pathology of any given disorder is to be appreciated and the treatment based on sound principles.

Thus, violent emotions, as has been demonstrated in animals and recognized in man, may initiate a general intestinal inhibition. Further, since a constant mild or even physiological stimulation, which allows no interval for rest, may in time equal the effects of a short violent stimulus, it follows that any excessive mental activity will not be without its concomitant inhibitory effect on the visceral system; and the same holds good for abnormal psychical conditions.

That such conditions are associated with various forms of "dyspepsia" (so-called) is common experience; but to label such disorders as varieties of "nervous dyspepsia"; to classify them according to their primary origin; and to base the treatment on such a classification with the expectation of a cure, is to invite disappointment alone.

In the case of the stomach, for instance, how does a general sympathetic stimulation affect this viscus? If my clinical deductions are correct, only the pyloric half and sphincter will be affected, the former being inhibited, the relaxation of the latter being prevented. In the visceral tract the effect of a local lesion takes precedence of a general, so that, even in the presence of a generalized inhibitory effect, such a pyloric closure constitutes an actual (even if intermittent) obstruction. The result is an increase and extension of peristaltic waves towards the cardiac end. Now this is not characteristic of stomachs whose function is inhibited from psychic causes, except under conditions which I shall refer to subsequently. Further, the achylia which usually accompanies the "dyspepsia" of this type is not, as a rule, associated with the active stomach. On these and other grounds I believe the effect of the emotions, etc., on the stomach to be almost entirely indirect. I have elsewhere expressed the belief that hunger, together with the associated exaggeration of gastro-intestinal rhythmic movements, is excited primarily by the afferent vagus impulses from the congested and loaded gastric, pancreatic and (possibly) intestinal glands. Exhaustion of the higher centres from any cause, such as fear, rage, worry, anxiety, overwork, unhappiness, etc., is manifested through the splanchnics in an excessive adrenalin secretion, leading, as we know, to suprarenal exhaustion.

The resulting suppression of pancreatic functions may well lead to a deficient afferent vagus impulse from this gland and the anorexia which is a common feature of this type of patient. Such a conception will account for the

characteristic symptoms manifested by these patients. Thus a defective afferent vagus stimulus will lead to a defective efferent response which will be evidenced by deficient rhythmic waves leading to poor peristalsis, or, in other words, to the "silent stomach." This defective mobility will probably be further associated with defective secretion (particularly from the cardiac end and fundus), thus accounting for the achylia and deficiency in hydrochloric acid. This is in marked contrast to the hyperactive stomach with hyperchlorhydria resulting from secondary reflex sympathetic stimulation from a lesion elsewhere. But, while I am inclined to regard the "silent stomach" as an indication of abnormal psychical disturbance, it by no means follows that the reverse is true. For it must not be forgotten that the vagus deficiency referred to leads also to defective rhythmic waves and a consequent imperfect peristalsis—that is, a defective motor power of the intestine. I have elsewhere endeavoured to show that this particularly affects the lower ileum and large intestine and may lead to any degree of intestinal stasis. Now in those subjects where there are no anatomical defects which predispose to direct or reflex intestinal inhibition (that is, when there is no mesenteric or peritoneal abnormality, whether congenital or acquired), the resulting dyspeptic symptoms, primarily and continuously of psychic origin, are clearly amenable to psychotherapy; and this method of treatment should be capable of effecting a permanent cure. But when such a primary psychic abnormality occurs in the presence of mesenteric bands or adhesions, ileal mesenteric control (whether from Lane's kink or "controlling appendix"), congenital mobility of caecum or colon, general visceroptosis, defective abdominal wall, etc., the clinical picture may well be of a different character. For in all these conditions, though normal function may be maintained, any overloading of the bowel is likely to throw the strain of support on the mesentery and initiate direct local and reflex general sympathetic inhibition, so that a secondary vicious circle becomes established, having its immediate origin in a local condition; even though the remote primary cause be psychical.

It has already been mentioned that in the gastro-intestinal tract the local condition dominates general influences; so that a resulting pyloric spasm would, in such an event, lead to an active stomach indistinguishable from the type seen to result from a primary local lesion.

What I should like to suggest for your consideration is this: That there are many subjects of so-called "nervous dyspepsia," the origin of which is clearly psychical, but in whom anatomical conditions (of which congenital mobility of the colon and mesenteric bands are the most frequent and important) predispose to intestinal inhibition in any of its forms should the exciting cause be severe enough, or sufficiently prolonged to establish it permanently. In such cases an established secondary lesion may lead to its own pathological sequelae, and in itself, though not the primary factor, may constitute the actual *fons et origo* of gastro-intestinal inhibition. Under such conditions psychotherapy can doubtless cause improvement (indeed, in a small way I know it can, particularly when combined with scientific medical treatment); it may even succeed in placing the sufferer in such a position as to neglect, by an effort of will, the disadvantages associated with his complaint. But is this the same thing as curing? Under these conditions, can suggestion put him in such a position of health that neither doctor, diet, drugs, laxatives, vaccines, nor careful hygienic instructions need interfere with his daily occupation or amusements?

It is one thing to keep a patient in tolerable health with constant medical attention and care; it is quite another ideal to place him beyond the need for these. Therefore, I should like to ask this: It is certain that some patients are wrongly operated upon when a psychical condition alone is at fault. Is it not at least equally probable that medical and suggestive methods might achieve better and more permanent results, with less likelihood of relapse, if anatomical or developmental irregularities (in themselves of potential harm) were also remedied? Similarly I think we surgeons often lose the opportunity of completing a permanent cure when we remedy the anatomical condition and overlook or neglect the psychic element.

At the same time it is curious to note that a large proportion of neurotic introspective subjects, whose intestines are their chief problem and entertainment in life, are the victims of congenital mobility of the colon or general splanchnoptosis—a fact which raises the question as to the possibility that, though such a condition is compatible with perfect health, this condition may be sometimes the primary origin of the psychic conditions under discussion.

We hear a great deal to-day of intestinal absorption and intoxication; and doubtless it is a very important subject. Yet no one can encounter the extraordinary condition of good health which may exist with constipation of an almost incredible degree, without wondering whether the importance of this has not at times been exaggerated.

I have elsewhere attempted to show that constant pathological afferent stimuli may result from continuous increase of mesenteric tension or drag (such as is to be noted in general visceroptosis). The efferent response to such stimulation is not limited to visceral reflex sequelae, but may be manifested in tachycardia, sweating, adrenal exhaustion and its attendant lassitude, etc. I would ask if it is not at least probable that the nervous origin of such symptoms at least equalizes in importance the much abused intestinal auto-intoxication? Psychic abnormality may well owe its inception to such continued impulses.

Such a conception is not without its clinical support.

For instance, I should like to quote the instance of a lady of something over 40 years, who had suffered for over thirty years from constantly progressive constipation and cachexia of the most pronounced type; enemas and purgatives often repeated were frequently without any result. Indeed, I have rarely seen such a picture of misery and hopelessness. The abdomen was explored in 1916, the appendix removed, and some bands divided. She had had a marked thyroid enlargement which subsided after the operation, but returned with a progressive deterioration of health. I saw her about eight months ago, and resected about two-thirds of the most flabby, dilated, overloaded, and inelastic colon I have ever seen. (Professor Keith was unable to find any recognizable evidence of the existence of Auerbach's plexus.) Almost immediately the thyroid enlargement practically disappeared; it became larger when she started walking about again; and now that her health is restored and she is able to enjoy her life the thyroid has assumed almost normal proportions.

These sudden variations appear to me to be too rapid to be attributed to infective agencies; and I have regarded it, rightly or wrongly, as evidence that pathological nerve impulses of visceral origin are often responsible for symptoms hitherto regarded as the result of intestinal absorption.

R. J. M. Buchanan, M.D., F.R.C.P.,
Liverpool.

Dr. Buchanan expressed his admiration of the work of Dr. Hurst, and welcomed the communication. He did not wholly agree with the idea that hysteria occurred in normal individuals, or that the stigmata of hysteria were a result of suggestion on the part of the observer. Many diseases had been recognized and classified before the underlying condition had been discovered. The physical stigmata might be discovered by accident. He related a case, one of so-called spinal disease, and for which an eminent orthopaedic surgeon had ordered a spinal support, and rest in bed. Dr. Buchanan recognized the hysterical nature of the case by the presence of anaesthesia of the right side of the face, from the presence of flies upon it, but to which the patient was quite oblivious. He did not consider that the flies suggested the anaesthesia, and he disclaimed suggestion on his own part. He considered that if vomiting suggested vomiting in hysterical cases, the initial cause might rightly be regarded as organic. He had noted the type of vomiting in soldiers described by Dr. Hurst, even in those who had not been gassed and who had not been out of this country. In many of these he had noted evidences of the stigmata of degeneracy, the common one being polymastia. Dr. Buchanan was not convinced that the pernicious vomiting of pregnancy was always hysterical, and related a case which, if this were true, ought to have come into this category, but which was due to the presence of a placenta left after incomplete artificial abortion—a case in which the woman had every reason in her own mind to hide her true condition, and the desire to do this should have suggested that the vomiting should cease. It did, but only when the placenta had left the uterus.

Dr. Buchanan did not consider that the feeling of distension attributed to flatulence—the so-called pseudo-flatulence—should be regarded so lightly. Personal

experience was sometimes valuable, and Dr. Hurst would have been surprised had he told Dr. Buchanan on the afternoon of a certain day that his feelings of distension and flatulence were neurotic, to find that within a few hours he had experienced an almost fatal haemorrhage from the duodenum. Dr. Buchanan considered that constipation and dyschezia were synonymous terms, but held that although common-sense persuasion was a useful asset in treatment, there were cases in which no amount of persuasion, but only instrumental delivery could produce the desired result. It was interesting to note that Dr. Hurst considered it occasionally necessary to re-educate the rectum by means of local suggestion in the form of graduated enemata.

In reference to the question as a whole, Dr. Buchanan drew attention to the two schools of thought—the psychical and the physical: the former considering that the number of those who suffered from so-called functional disturbance of the stomach was greater than those who suffered from organic disease; the latter, that "nervous dyspepsia may cease to be classed as a distinct type of disease when methods of diagnosis shall have become more perfect." In Dr. Buchanan's experience the so-called nervous or functional diseases of the stomach were fewer than had been previously accepted, and in the majority of cases which were previously so classified organic disease was present. He considered that, in the near future, "psychic causes will be regarded as equivalent to the exhaustion of diagnostic resources." He recalled the fact that functional disturbance and organic disease often coexist, and the one enhances the other; and he issued a note of warning lest the substance be left for the shadow. Further, that those who became over-enthusiastic in favour of the so-called psychical cause, stood in danger of having their belief rudely and dramatically shaken, and that not infrequently.

Dr. J. A. NIXON (Bristol) spoke of the value of Dr. Bennett's investigations as showing the wide variations compatible with normal health and nutrition, also of the importance of taking every advance made in physiological knowledge to the bedside. Though the emotional factor in the control of gastric and intestinal functions was, as Dr. Hurst pointed out, very powerful, still it should be realized that underlying the strong emotional impulse might and frequently did exist a physical or organic basis. This organic basis might be very slight and apparently insufficient. It would require every scientific method of investigation to discover this organic cause, and then it was exceedingly difficult to estimate how far the psychical element was superadded.

Dr. R. G. GORDON (Bath) said: There seems to be a tendency amongst physicians who are interested in the organic diseases of the digestive system to presume that those who practise psychotherapy never examine the physical condition of their patients. One might retort that the former do not always sufficiently consider the psychical factor. Dr. Hurst referred to the digestive complaints of patients suffering from psychasthenia, and it is very common for such patients when they consult the physician to hide their mental and emotional symptoms owing to their fear of insanity, and their dread that if they talk about them they will immediately be incarcerated in an asylum. For this reason they lay stress on any physical symptoms they may feel. It is characteristic of these cases that they have little control over their emotions—they are irritable, they weep easily and laugh easily, and therefore will experience all the more readily the physical expressions of the emotions. As Knupf and others have shown, the chief of these are activities and inhibitions of the unstriped muscles of the body and those muscles only partially under voluntary control. Under the stress of anxiety the diaphragm is affected, and this is translated by the patient as something wrong with the stomach. This may be intensified by hysterical aërophagy, etc., but the point to be borne in mind is that in this particular group the trouble is not digestive at all, and while careful physical examination is necessary in all cases, the mental examination should not be neglected, and in some cases the anxieties and obsessions of psychasthenia will be unearthed by sympathetic questioning.

Dr. W. T. TYSON (Folkestone) said: The literature of the subject is exceedingly scanty, but as far as my reading goes, the best paper on it is by Sir Clifford Allbutt in his *System of Medicine*. These cases occur at all ages, in quite young people as well as in those of advanced life. Men and women are equally affected. The symptoms are the same as in other diseases of the stomach, only they have no discoverable anatomical basis; but there are some marked peculiarities—for example, the symptoms often cease suddenly for a week or much longer without any obvious change in the diet or in treatment. The general nutrition varies very much, sometimes it is not at all affected, and at other times there is great emaciation. I consider that the diagnosis is often most difficult, and sometimes impossible.

Dr. E. HOBHOUSE (Brighton) said: With much of Dr. Hurst's interesting paper I cordially agree, and particularly with his remarks on the cases of this character arising during the war, of which I saw fairly large numbers. But there is one fundamental difficulty which arises as soon as we begin to attach neurological labels to these diseases; it has been partially revealed in the discussion this morning. No two writers seem to agree exactly as to what they mean by neurasthenia, psychasthenia, hysteria. Many, for example, would disagree with the definition of hysteria given by Dr. Hurst, which practically eliminates any hysterical state and reduces hysteria to a congeries of symptoms produced only by suggestion. To gain further information as to his exact point of view, I should like to ask Dr. Hurst what he considers to be the exact mechanism of suggestion in the cases he mentioned of spasm of the diaphragm associated with chronic disease of the colon. Further, I would ask why he denies to neurasthenia that effect on the digestive processes which he admits in cases of psychasthenia, even though the two conditions are fundamentally different. Before we can really discuss many of these questions quite satisfactorily I think we need a neurological congress to determine what we mean or intend to mean by the various terms employed. On the general question I believe the truth will be found ultimately somewhere midway between the positions taken up by Dr. Hurst and Dr. Buchanan respectively.

Dr. EMANUEL LIBMAN (New York) spoke as follows: The disturbance of the gastro-intestinal tract not due to structural disease may be classified as neurogenic, psychoneurogenic, metabolic, and endocrine. Dr. Hurst has drawn the distinction between neurogenic and psychoneurogenic causes, and Dr. Brown has drawn attention to those of endocrine origin. It is interesting to note the occurrence of disturbances due to diseases of the accessory sinuses, especially of the sphenoid sinus. Gastric disturbances occur, but these have been less studied than the intestinal ones. While attacks of sinusitis may be accompanied by diarrhoea, more commonly there is a spasm which involves the sigmoid flexure. This effect is probably due to a toxic effect upon the nerves. The symptoms of so-called flatulent dyspepsia may be produced by sigmoidal spasm, by chronic appendicitis, and other causes. Of course Dr. Hurst, in his presentation, excluded all organic causes when he discussed the question of flatulent dyspepsia. The picture produced by any disease depends a great deal upon the sensitiveness of the person involved, especially the sensitiveness to painful impressions. One can tell a great deal about that by a simple test that I have been using for a number of years. One presses first on the mastoid process. This is used as a control because it is normally not sensitive. Then one presses against the styloid, and most people will indicate that the pressure is painful. Some people are much less sensitive than what we can call the normal, some are not sensitive at all, and some are very sensitive. We find hyposensitive, hypersensitive, and what we can call normally sensitive types. Individuals who are hyposensitive often do not develop the full-fledged symptomatology of a disease. Thus, if they have an ulcer, they are apt to complain of burning, or pressure, rather than of pain. They are also apt to have less marked hyperalgetic areas on the skin with visceral disease. We had a good opportunity of studying this last point by making observations on sigmoidal spasm. When the

sigmoid is contracted it is usually locally tender when rolled. There is often present a hyperalgetic area that has not been described. It lies about midway between the left superior anterior spine of the ilium and the umbilicus. When this area is present there is always also present a hyperalgetic area on the right side, just above Poupart's ligament, having about the same localization as that described by Sherren in cases of appendicitis. (The difficulty found with Sherren's observation was due to the fact that the zone on the right side was often due to sigmoidal spasm.) In hyposensitive persons we found the hyperalgetic areas of sigmoidal origin diminished or absent. In the area for diagnosis, of all data depending on sensations of pain, we find that the symptoms are all the more significant if the patient is hyposensitive, and that the absence of certain symptoms, in a given disease, in a hypersensitive person, should make us cautious in making the diagnosis positive. In making some observations on patients suffering from putrefactive intestinal conditions we came across what appears to be a good example of a metabolic (or better chemical) effect upon intestinal innervation. In some of these persons we found that the faeces contained very few colon bacilli. They were treated by the implantation of colon bacilli (according to the method of Mr. J. J. Connellan, who based his work on the observations of earlier investigators). In a number of the patients so treated the toxicity of the faeces was reduced. He noted that in some of those in whom the treatment had been successful, and who before its administration were constipated and suffered from sigmoid contraction, the movements became copious, and were no longer narrow. The evidences of sigmoidal contraction often diminished or disappeared for quite long periods. We must therefore keep in mind the possibility of toxic intestinal contents causing disturbance in the intestines by affecting the local nervous mechanism.

Dr. Craven Moore (Manchester) said: War experience has shown that psychical influences may be the underlying factor in a more or less grossly manifest disorder of the functional activity of the stomach. Personal investigation of a large number of these cases showed that the disorder was one of motility. In normal civil experience nervous dyspepsia of psychical origin does obtain, but it is comparatively uncommon; the great majority of all such cases are of reflex origin, depending on some lesion more or less gross and more or less remote from the stomach—duodenum, gall bladder, appendix, colon, kidney, organs of generation, etc.; and on a varying instability of the reflex nervous mechanism. The functional disorder concerns both secretion and motility. In the diagnosis and treatment of these cases it is of first-rate importance to recognize the existence of these two factors, treatment being directed to the removal of the maintaining lesion and the restoration of a normal nervous stability.

Dr. A. R. Parsons (Dublin) expressed the opinion that no case of gastro-intestinal disorder should be finally regarded as purely functional in origin till all known methods of physical examination had failed to disclose evidence of any organic disease. X-ray examinations, test meals, analyses of gastric contents, etc., were in many cases essential in arriving at a correct diagnosis. Detailed clinical examination, however, even though aided by modern methods of physical investigation, might, at times, fail to detect any organic lesion and yet, as subsequent events prove, the case might not be functional. As an illustration of the difficulty which may arise in differentiating between a functional and an organic case he mentioned briefly the history of a young woman who was admitted to hospital suffering from severe and persistent vomiting, and consequential emaciation. Routine clinical examination was negative. There was no free hydrochloric acid, and no latent blood in her gastric contents. Various sedatives were tried in vain, and she died one week after admission. An autopsy revealed advanced tuberculous disease of both adrenals. There was no pigmentation of the skin or mucous membranes.

Lord Dawson of Penn (London) urged the necessity of taking a broad view in cases of this class. He roughly divided two types of patient who were liable to suffer from vague gastro-intestinal discomfort: first, those who were found to have high blood pressures suffered abdominally whenever they were below par, and secondly, others who were found to have a low blood pressure were patients who were always ailing and who frequently had symptoms of abdominal discomfort—such patients suffered from the raising into consciousness of functions that ought to be unconscious. In all patients in whom there was a strong suspicion of organic disease Lord Dawson recommended an early exploratory operation.

Opener's Reply.

Dr. Hurst said: I wish in the first place to make it clear that I never make a diagnosis of either organic or functional disease in a chronic gastro-intestinal case until a thorough investigation has been carried out. In addition to the ordinary clinical examination, the gastric functions are studied by means of the fractional test meal, the stools are examined, and occult blood is looked for after the patient has been on a haemoglobin-free diet for three days. An *x*-ray examination of the entire alimentary tract is carried out, and a sigmoidoscopic examination is made in intestinal cases. A diagnosis of colitis ought never to be made until this has been done, and I cannot agree that the term should now be used in the absence of definite evidence of inflammation of the colon. When the investigation has been completed, it should be possible to say whether the condition is organic, functional, or—as it is in very many cases—organic with a superadded functional element. If the condition is functional, it is then necessary to find what is its exact origin, and whether it is due to neurasthenia, hysteria, or psychasthenia.

It is only in certain cases of hysterical vomiting that complete investigation may not always be necessary or desirable. For example, we learnt during the war that if vomiting persisted for more than three weeks after gassing, it was always hysterical, and as we had no means for carrying out complete investigations, we proceeded at once to cure the patient by psychotherapy. I cannot agree with Dr. Nixon that most cases of digestive disturbance during the war were organic. We had probably fifty cases of vomiting in soldiers at the Seale Hayne Hospital, and out of these about forty were hysterical and were cured by explanation and persuasion, generally at a single sitting. The remainder had an organic basis—the primary cause of vomiting being generally appendicitis, dysentery, or phthisis; even in these the reflex vomiting was often exaggerated and the patient's condition aggravated by the addition of an hysterical element.

With regard to the so-called pernicious vomiting of pregnancy, if Dr. Parsons's advice was followed and the psychotherapeutist only called in when everything else had failed, it would be too late, as in several of the cases I have seen the patient was moribund, and if further investigations had been carried out before psychotherapy had been employed the patient would certainly have died.

Mr. Tyrrell Gray has referred to the advantages to be gained by a close association of physicians with surgeons. With this I cordially agree, and I must acknowledge that I have learned more about gastro-intestinal diseases from Sir Berkeley Moynihan than from any physician. But it is none the less a matter of regret that in the Surgical Section at this moment he should be discussing eight different operations for gastric ulcer, when, if practitioners and physicians only did their duty, cases of ulcer would never reach the stage in which the surgeon's help was required. I think Mr. Tyrrell Gray lays rather too much stress on spasm, as achalasia, or absence of relaxation, is more frequently the cause of delay at the cardia, pylorus, and ileo-caecal sphincter than spasm. I also think he lays too much stress upon the necessity of correcting displaced organs by surgical means. I cannot believe that in the majority of cases a congenitally low caecum is of any more importance than a crooked nose.

There is no time now to explain to Dr. Buchanan why I do not believe in such a condition as hysteria apart from hysterical symptoms. Hysterical vomiting and many other hysterical symptoms are found with equal frequency in people who show no evidence of any undue suggestibility, and have none of the physical or mental stigmata which have been thought to be characteristic of hysteria. He will find a more complete discussion of this question in the Seale Hayne Neurological Studies which

we published during the war. I did not mean to suggest that a feeling of distension like that which he felt before his haematemesis is hysterical, but a feeling of this kind is in many cases the exciting cause of hysterical aërophagy.

In reply to Dr. Hobhouse, the digestive symptoms which follow exhaustion or neurasthenia are entirely distinct and need entirely different treatment from the symptoms resulting from the disordered emotions in psychasthenia.

Dr. Parsons must have entirely misunderstood me if he thought I would attempt to treat by psychotherapy a case such as the one he related of death from Addison's disease. Psychotherapy is, of course, only indicated in digestive symptoms which result from hysteria and psychasthenia, and nobody in his senses would suggest that Addison's disease is of this nature.

Finally, I should like to indicate what I believe to be the best method of treating the digestive psychoneuroses. I did not use the word "psycho-analysis," as this has come to be regarded as synonymous with the discovery of a sexual origin of disease and the employment of certain elaborate methods of examination, but a psychological analysis is none the less essential if we wish to discover the psychical origin of hysterical and psychasthenic symptoms. This can almost invariably be done by tactful cross-examination when we have obtained the patient's confidence. The symptoms can then generally be cured within a comparatively short period by explanation, combined in some cases with persuasion and re-education.

SUBACUTE PERINEPHRIC ABSCESS OF NON-RENAL ORIGIN.

BY

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PERINEPHRIC ABSCESS, not secondary to disease of the kidneys, is a fairly common condition which is frequently misdiagnosed in the early stages. When accompanying renal disease attention is more directly focussed on the kidney region and associated abscess is unlikely to be missed, but the insidious development of metastatic perinephric abscess and the paucity of localizing symptoms at first are responsible for many mistakes and make the subject one worthy of special consideration.

ANATOMY.

The kidney is closely invested by its true capsule and enclosed within the fibro-fatty capsule, the anterior and posterior layers of which blend above with the fascia covering the diaphragm and below fuse an inch or two below the lower pole of the kidney. Laterally the layers soon fuse and medially the renal pelvis is invested by the layers which are lost in the fascia in front of the vertebrae. The fibro-fatty capsule is lax and cellular, and is not very vascular—a fact which may account for the feeble resistance which is offered when microbial infection takes place. The capsule rests upon the diaphragm above and the psoas and quadratus lumborum below, but there is a layer of fascia which intervenes, the thin diaphragmatic fascia and the dense anterior lamella of the lumbar fascia in the upper and lower parts respectively. Anteriorly, where the kidney lies in contact with various viscera the fibro-fatty capsule is not so cellular and the peritoneum is in relation with it in several places.

As might be expected from anatomical considerations, the majority of abscesses develop posterior to the kidney. Of 14 perinephric abscesses under my care, 8 were retro-renal, 2 were above, 3 were below, and one was intra-peritoneal in front of the kidney.

ETIOLOGY.

The term subacute is meant to exclude cases of tuberculous infection which sometimes develop apart from any renal or vertebral focus.

The common organism found in the abscess is *Staphylococcus aureus*. Of 12 abscesses in which the nature of the organism was reported upon, 8 contained the staphylococcus, 3 a streptococcus, and one a bacillus of undetermined nature.

The source of origin of the infection is often doubtful, but in general the cases can be referred to two groups: (1) Metastatic cases following a suppurative process elsewhere in the body, especially whitlows, carbuncles, or boils; (2) those associated with or consequent to dysentery or diarrhoea. Three of my cases developed immediately consequent on a whitlow. This source of metastatic infection has been frequently noted. Several observers (notably Israel) have drawn attention to the fact that sometimes a perinephric abscess is the result of extension of a small cortical renal abscess of metastatic origin. One of my cases seemed to fall into this category, for there was a small localized abscess in the cortex of the kidney communicating with the perinephric abscess. Such cases do not present urinary symptoms. Four cases were associated with dysentery or diarrhoea, but the organism in all four was a septic organism (three staphylococcal, one streptococcal), so if there be any direct connexion between the two conditions it must be that the inflammatory condition in the colon permits septic organisms to escape more readily. In one patient who on clinical grounds had been diagnosed as a case of typhoid fever (though no laboratory confirmation was forthcoming) a bacillus was found in the abscess, but its exact nature was not determined. In several cases it was difficult to find any focus from which infection might have occurred.

SIGNS AND SYMPTOMS.

The course of a perinephric abscess may be divided into two stages:

I. The stage of symptoms only.
II. The stage when signs are present and may predominate.

I.

The onset is usually very insidious. The patient feels out of sorts, and when he consults a doctor the only constant feature is slight fever. The morning temperature may be normal; in the evening it is usually raised to 100° or 101° F. Sometimes pain in the side below the ribs is complained of, but no indication of any serious trouble around the kidney can be elicited. The absence of local indications causes the condition to be mistaken for a continued fever, such as one caused by the typhoid group of organisms.

Occasionally the onset is more acute, with a rigor or "chill" and general pains such as may accompany an influenzal attack. In the absence of local symptoms this may easily mislead and cause a diagnosis of influenza to be made. Vomiting is occasionally noted.

II.

After a variable period during which the patient's general condition depreciates considerably, whilst the fever continues or increases, definite signs appear either in the abdomen or in the thorax or in both. It is not usual for diagnosis to be made until the signs appear. This accounts for the very variable time in the course of the disease that the cases come to the surgeon. The average time in my series from the commencement of the disease until surgical intervention was approximately three weeks—a fact which gives clear indication of the common absence, or paucity of localizing symptoms in the early stages of the condition.

In the second stage the symptoms comprise irregular fever, a varying grade of anaemia, loss of weight consequent on the fever, and pain in the subcostal region. The signs are tenderness on pressure in the angle between the last rib and the erector spinae, and evidence of compression of the lung or effusion of fluid in the lower part of the chest; or if the abscess is subnephric a swelling in the right loin. There may be flexion of the thigh owing to psoas-irritation. Blood examination will show a leucocytosis.

The fever is remittent and may reach 101° to 103° at night. The anaemia is progressive and may become extreme. The pain is of a dull aching nature, sometimes referred to the hypochondrium, more often felt in the loin, immediately under the rib margin. In every case pain is elicited on deep pressure at the erector-costal angle.

The signs in the thorax are sometimes those of compression of the lung evidenced by dullness and other signs of consolidation, but more usually pleural effusion causes diminution of breath sounds at the base of the lung.

There may be a few moist sounds heard on auscultation. The pleural exudate is sometimes clear serum or may be sero-purulent. In one case in which there was a thick-walled abscess containing thick pus below the diaphragm there was a slight sero-purulent effusion containing streptococci in the pleural cavity. The leucocyte count averaged about 15,000 in those cases examined; the smallest count was 10,600 and the largest 27,500. A differential count never showed any great variation from the normal proportions.

The signs and symptoms of an intraperitoneal perinephric abscess may be baffling. The only case I have seen was a sequel to a retroperitoneal abscess on the left side. It developed when the patient was convalescent from the former condition, and was clearly due to infection spreading through the peritoneum. The diagnosis was not made for certain until an abscess caused a definite swelling in the left hypochondriac region.

In the late stages of a perinephric abscess there may be a fullness in the loin, and oedema of the skin and subcutaneous tissues may develop in that region. This is a rare event, however, since the lumbar fascia is very dense and prevents the pus from reaching the surface easily.

DIAGNOSIS.

Diagnosis is usually easy when the condition is well developed. An irregular fever, accompanied by leucocytosis and pain in the loin (especially elicited by pressure in the erector-costal angle), with either a lump in the right lumbar region or the signs of pleural effusion, or basal congestion of the lung on the same side, make the diagnosis probable. Examination of the urine is usually negative; the presence of pus would be in favour of pyonephrosis. When in doubt, needling of the subphrenic region is necessary to confirm the presence of pus, and in some cases exploration by incision is indicated.

Differential Diagnosis.

Nine out of the thirteen patients were either living in tropical or subtropical countries, or had dwelt in them comparatively recently. That the diagnosis which had been made prior to the calling in of the surgeon was in three cases malaria was not therefore surprising. Two other cases had been diagnosed hepatitis of dysenteric origin. Two cases were thought to be enteric fever, one pleural effusion, another empyema, and finally one had been taken for influenzal pneumonia.

In a tropical country the continued irregular fever very naturally leads to a tentative diagnosis of malaria, and this is sometimes apparently confirmed by the finding of the parasite in the blood. In two cases in my series this was the case. But antimalarial treatment caused no improvement in the symptoms, and the local signs of perinephric abscess gradually asserted themselves. An increased leucocyte count is an important differentiating factor in diagnosis. The leucocyte count is also of value in distinguishing enteric fever from perinephric abscess, for as a rule there is no increase in the leucocytes in typhoid and paratyphoid fever. It would appear as if the provisional diagnosis of enteric fever may somewhat lull the medical attendant into a false satisfaction that the full diagnosis has been made, for the perinephric symptoms were in two such cases allowed to advance considerably before attention was focussed upon them. Examination of the faeces for the causative bacilli and of the blood serum for agglutinative reaction to the bacilli should serve to exclude enteric fever definitely. In the second stage, when signs appear at the base of the lung, and where referred pain may be complained of in the hypochondrium, there is likelihood that pleural effusion, empyema, or basal pneumonia may be diagnosed on the one hand, or hepatitis or even liver abscess on the other. Amoebic hepatitis would be suspected if the faeces contained amoebae; it can be readily excluded if the symptoms do not rapidly abate on the administration of emetine hydrochloride (gr. j per diem subcutaneously). With liver abscess the history is often different, and there may be pain in the shoulder. If there is no swelling in the loin the only way certainly to diagnose is by exploration by a hollow needle. This is best carried out under an anaesthetic. The needle should be one with a good sized lumen and at least three inches long. It should be attached to the barrel of a 10 or 20 c.cm. Record syringe, of which the suction power should have been previously tested. The place for exploration should be the eighth or ninth space in the axillary line, or the ninth or tenth space in the scapular line. If no pus is found, then the needle may be thrust in any dull spot in the spaces above that may seem a possible site of the abscess. With a subphrenic abscess about the upper pole of the kidney it is quite common to find a serous effusion in the pleural cavity, and on one occasion in my series the effusion was turbid and found to contain streptococci. If clear serous fluid is withdrawn by the needle the point must be in the pleura, for serous effusion under the diaphragm is exceedingly rare. The needle should be withdrawn and inserted in a lower space to a greater depth, when pus should be found.

In retronephric or subnephric abscesses the swelling in the loin will be obvious, but the likely diagnosis will be pyonephrosis. A pyonephrosis usually causes a more prominent swelling anteriorly than does a perinephric abscess, and there is nearly always some history of urinary trouble. An *x*-ray photograph to demonstrate any stones, and examination of the urine for presence of pus and to exclude tubercle, are necessary procedures. A radiogram is also useful in demonstrating any displacement upward of the diaphragm or indication of any abscess above the liver, whilst the outline of an enlarged kidney might be seen. Cystoscopy may also be of use in excluding renal disease.

A more acute perinephric abscess needs to be differentiated from a retrocaecal perforated appendix. In such cases a small abscess may develop retroperitoneally below the kidney and diagnosis may be difficult unless the history of the case be carefully borne in mind. When a perinephric abscess causes irritation of the psoas with consequent flexion of the hip the subsequent lump may at first draw attention more to the hip-joint than to the psoas region. I have known a streptococcal subnephric abscess mistaken for tuberculous hip disease.

PROGNOSIS.

Uncomplicated extraperitoneal perinephric abscess of non-renal origin is a condition which permits us to give an excellent prognosis if skilled surgical assistance is available. Every case I have treated recovered, although two or three had reached an extremely debilitated condition before the abscess was detected.

The prognosis of intraperitoneal perinephric abscess is more doubtful. The only case in this series was a streptococcal infection which followed a retroperitoneal infection, and which led to infection and necrosis of part of the spleen with a consequent fatal result. We are not concerned here with intraperitoneal abscess developing in the perinephric region consequent on contiguous inflammatory conditions such as appendicitis or leaking duodenal ulcer.

TREATMENT.

The treatment of perinephric abscess is by incision and drainage. In retronephric and subnephric cases the procedure is very simple. Under an anaesthetic, and with the patient lying on the sound side, an oblique incision about two inches long is made at the outer border of the erector spinae about half an inch or an inch below the last rib. The soft tissues are incised until the middle lamella of lumbar fascia is reached and the quadratus lumborum seen. The latter muscle is retracted, and the anterior lamella of lumbar fascia, which is often thickened, is incised. The finger is then inserted into the perinephric space and the indurated or oedematous abscess swelling identified. By means of a director, sinus forceps, Spencer Wells forceps, or the finger, the abscess is opened and a rubber drainage tube inserted. The wound is loosely sewn up and the tube stitched to the skin.

The drainage of supranephric abscesses is often more difficult. They may be opened by a transcostal route, but I have always managed to drain them by a subcostal incision. In one case, though I could just reach the induration through an incision made in the loin at the outer border of the erector spinae, yet I found it impossible to open it. I therefore made a costal incision, excised a portion of one of the lower ribs, opened the pleura, and then, by bimanual manipulation, was able to open the abscess through the original incision. The costal incision was promptly sewn up and kept free from contamination.

In this case the slight downward movement of the diaphragm, consequent on opening the pleura, facilitated the opening of the abscess from below.

I append an account of a case of bilateral perinephric abscess which came under my care in Baghdad two years ago. Such a condition merits recording because of its rarity and difficulty in diagnosis.

Pte. G., of the Highland Light Infantry, came under my care in May, 1918, with the history of a month's continued fever. He had been treated for two weeks as enteric fever. The blood examination showed no malaria parasites but there was a leucocyte count of 23,250. The differential count showed polymorphs 77, lymphocytes 18, large mononuclears 4, transitional 1. When I saw him there was clear evidence of a left perinephric abscess. On May 23rd, 1918, I opened an abscess which lay behind the left kidney. The abscess cavity was bilocular, one small loculus being inside the true capsule of the kidney, indicating a possible origin from a small metastatic cortical renal abscess. The urine had shown no pathological changes.

After operation the patient's condition improved slightly but the fever continued. The sinus was explored on June 6th, 1918, but no other pocket of pus was found. On June 14th the leucocyte count was found to be 26,000, and the patient had become very anaemic and emaciated. For some days he had complained of pain in the right hypochondrium and had a slight cough, and there was evidence of slight basal congestion of the right lung. On June 15th I once more explored the left-sided sinus unsuccessfully. I then needled the liver, the right base of the chest and the right subphrenic region, but found nothing pathological. With the concurrence of Colonel Hugo, I.M.S., I then made a right subcostal incision, and inserted a finger well up under the diaphragm above and behind the kidney, and to my relief opened an abscess in that position. Both abscesses contained staphylococci only. An uninterrupted recovery followed the drainage of the second abscess. In the case of this abscess the only localizing signs were slight tenderness under the right costal margin, and slight congestion of the right lung base.

Summary of Thirteen Cases of Retroperitoneal Perinephric Abscess of Non-renal Origin.

Case.	Cause.	Previously treated as	Time Elapsed before Diagnosis Made.	Position.	Leucocytes.	Micro-organism.
1	? Enteric	Enteric fever	9 wks.	Retro.	—	A bacillus.
2	Dysentery	Hepatitis	2 wks.	Retro.	10,600	Staph.
3	Dysentery	Hepatitis	10 days	Sub.	—	Staph.
4	Whitlow	Pleural effusion	2 wks.	Retro.	15,000	Staph.
5 A	?	Enteric fever	5 wks.	Retro. (l.)	23,250	Staph.
5 B	?	Enteric fever	—	Supra. (r.)	26,000	Staph.
6	Whitlow	—	—	Retro.	15,700	—
7	Whitlow	Malaria	4 days	Retro.	14,000	—
8	Diarrhoea	Malaria	2 days	Sub.	—	Staph.
9	?	Influenzal pneumonia	4 wks.	Retro.	—	Staph.
10	Diarrhoea and Carbuncle.	Empyema	2½ wks.	Supra.	27,500	Strept.
11	?	?	7 wks.	Retro.	—	Staph.
12	Influenza	Hip disease	4 wks.	Sub.	—	Strept.

All the cases recovered.

MENSTRUATION DURING SCHOOL LIFE.*

BY

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As the medical inspector of a large girls' school I have had the opportunity of obtaining details, over a period of five years, on the menstrual function in 1,200 healthy girls, the larger proportion of them boarders. Owing to my absence abroad during part of the war, the notes were kept for two years by Dr. Eveline Cargill, to whom I am greatly indebted. The girls are examined medically every year, and, in addition to the health chart, a note-sheet on the particulars of menstruation is kept for each girl, dating from the first time she is examined after the onset of the catamenia. In many cases menstruation had begun several years before the first interview. The girls, whose ages range from 9 to 21 years, are in sound health and are the children of educated parents in easy financial circumstances.

The main objects of these investigations were:

1. To determine the proportion of girls suffering from any disability during menstruation.
2. To inquire into the habits of each girl during her period, with a view to tracing the effects of these habits on her health.
3. To watch the effect of school life on the menstrual function, especially with regard to study, exercise, and general hygiene.

The results of some of the inquiries are shown in Table A, but some of the terms used in it require explanation.

Irregular Menstruation.—Under this are included all those whose periods do not occur every three, four, or five weeks. It therefore includes all cases of amenorrhoea—which subject will be dealt with later.

No Pain or Discomfort.—The proportion of girls free from any disturbance whatever (73 per cent.) is probably larger than the average among girls of the well-to-do classes, but a possible explanation of this is also given below. In this group are included those who state that they are usually free from any discomfort, but have experienced slight pain or discomfort very occasionally.

Pain.—This, which is mostly of the congestive type, is difficult to estimate, and at the best can only be roughly classified. The spasmodic type of dysmenorrhoea is very rare, only 4 out of the 1,200 cases being recorded. There was one case of intermenstrual pain or Mittelschmerz.

Incapacitated.—Under this heading are grouped all those who state that, on account of pain, sickness, or headache, they are rendered unable to carry on their ordinary pursuits. In some cases they have to retire merely for half an hour or so.

Malaise.—This term refers to all those who suffer from headache, nausea or lassitude in a mild degree.

Rest during the Period.—It is found that the large majority of those who are in the habit of lying down or resting in bed during the period, do so against their own inclinations by order of the mother.

Baths.—It is surprising to find how the old prejudice against the use of water during the menstrual period still clings even to educated people, who in other respects are most attentive to the laws of personal hygiene. In most families the girls are still taught that it is dangerous to take baths at those times, and that their ablutions should be limited to the face, neck and hands. Very few are allowed to wash their feet until after the flow has ceased. The figure 23.4 given in Table A is much larger than the proportion of girls taught at home to take baths. In this and, in fact, in all the figures the influence of school life and teaching is already manifest.

Games and Exercise.—It was found that most of the children would, if left to themselves, play games, cycle, and take walks as usual throughout the period, but that they have not been allowed to do so. It is amusing, however, to find how many of the elder girls succeed in overriding their parents' objections if the period happens to coincide with a hockey or tennis match, a dance, or a day's hunting. In no case has any ill effect been acknowledged.

TABLE A.

(Number of girls questioned, 1,200.)

	No.	Percentage.
Regular menstruation	646	53.8
Irregular menstruation	554	46.1
No pain or discomfort	877	73.0
Discomfort or slight pain	294	24.6
Severe pain	29	2.4
Incapacitated	64	5.3
Malaise	109	9.0
Rest during the period	276	23.0
Baths during the period	281	23.4
Games and usual exercise during the period	488	40.7
Constipation during the period	108	9.0

* The substance of a paper communicated to the Gloucestershire Branch of the British Medical Association.

Constipation.—Although this is not a common complaint among school girls some of them have a tendency to it during menstruation, and it seems to be a common belief that aperients should be avoided at these times.

Advice Given to Each Girl.

To every girl I explain that menstruation is not a malady but a natural function, and that the natural and proper thing is for her to feel quite well and free from pain or any unpleasant sensations. I emphasize that it should not be necessary to lie down, and that if she feels too poorly to enter into the ordinary life of the school, she should have advice from her doctor, as any trouble connected with her period can be much more easily put right now than after it has become established for years.

I further explain, usually to her great astonishment, that it is quite safe for her to have a bath, and that she should if possible take one at the onset of the period, hot enough just to flush the skin, and continue to take a warm bath daily throughout the period; that immersion in hot water will relieve, if it does not put a stop to, any slight headache or feeling of local discomfort.

With regard to exercise, I tell her that, provided she feels well, exercise will do good rather than harm, and that there is no need to cut herself off from walking, cycling, horse-riding, outdoor games, dancing, or gymnastics. Swimming, for obvious reasons, cannot be indulged in. I furthermore explain that most unpleasant sensations associated with menstruation are dispelled by a brisk walk, whereas they are prolonged by lying down. In all cases the consent of the parents is obtained before any change in regimen is adopted.

All girls suffering from amenorrhoea associated with ill health, menorrhagia, leucorrhoea, constipation, or the severer forms of malaise and dysmenorrhoea, are referred for treatment to their medical attendants.

As already stated, Table A gives the details elicited at the first interview. Of these 1,200 girls 734 have been seen more than once. In Table B the information obtained at the first and subsequent interviews is tabulated for comparison.

TABLE B.

(Number of girls questioned at each interview, 734.)

	First Interview.		Subsequent Interview.	
	No.	Percentage.	No.	Percentage.
Regular menstruation	383	52.2	525	71.5
Irregular menstruation ...	351	47.8	209	28 5
No pain or discomfort	498	67.8	625	85.1
Discomfort or slight pain ...	224	30. 5	105	14.3
Severe pain...	12	1.6	4	0.5
Incapacitated	38	5.1	7	0.9
Malaise	70	9.4	17	2.3
Rest during the period	149	2 ,3	46	6.2
Bath during the period	84	11 9	313	42.0
Games and usual exercise during the period	270	35.3	493	67.1
Constipation during the period	52	7.0	19	2.5

It will be observed:—

1. That the percentage of girls who suffer from no disability, or—as they usually express it—"don't feel anything different," has risen from 67 to 85 per cent.
2. That there is a notable diminution in the number of those suffering from various degrees of pain or malaise—a total of 17 per cent. as against 41 per cent.
3. That only 6 per cent. instead of 20 per cent. lie down during the period.
4. That there is a large increase in the number of those taking baths and playing games.
5. That there is a decrease in the number of cases of constipation.

It appears to me that these figures bear a relation to one another, and that it is the practice of taking baths, and more especially exercise, which has reduced the number of those suffering from the congestive forms of dysmenorrhoea and constipation. In studying the individual note-sheets this fact has been brought out in a very large number of cases.

The Effect of Baths and Exercise.

Over a hundred former sufferers testified to the beneficial effect of the hot bath, many attributing their freedom from pain entirely to it. Several, however, have not obtained their mothers' consent to try the bath. Two said that they felt faint after the bath, so did not repeat it. Five felt no benefit at all; one of these has since been cured of her dysmenorrhoea by appendicectomy; another, who was formerly free from pain, has had dysmenorrhoea ever since she was operated on for appendicitis.

The verdict in favour of exercise during menstruation is also almost unanimous. Several of the girls had discovered its beneficial effect before the first interview. Many volunteered the information that they had pain or felt poorly during the holidays only; most of these were made to lie down when at home during the first day of the period. Six, of whom two did not like games at any time, stated that exercise did not suit them; two of them said that exercise had the effect of making the next period more profuse. In some of the boarding houses the old regulations still hold, and the girls are forbidden to go to the playing field for the first three days of menstruation. On comparing the records of these girls with those of the houses where freedom of action is allowed, the efficacy of the bath and exercise is very apparent. For the last five years the large majority of the girls have been free to play games or take any other exercise (except swimming) during menstruation, and not one casualty has occurred, nor have any cases of ill effect been reported to the house doctors.

A word of explanation is called for with reference to the apparent discrepancies between the figures in the Tables A and B. In Table A 73 per cent. are stated to be free from any disturbances during menstruation, whereas in Table B the figure is only 67 per cent. I believe both these figures to be above the average; they are certainly higher than those obtained by Dr. Chisholm,[1] who found that, among the school girls she was examining, in "58.6 of the cases there was no disturbance of any kind admitted." The discrepancy is due to the fact that Table A is compiled from a larger number of girls seen recently, and it is found that the percentage of girls free from any menstrual disturbance, when first questioned on the subject, is increasing year by year, as is also the percentage of girls taking baths and exercise during the menstrual period, this practice being adopted from the first by the younger children in some of the boarding houses.

It is agreed by writers on gynaecology that congestion is a large factor in the cause of the commoner types of dysmenorrhoea. This theory is borne out by the effect of the hot bath, which, by dilating the peripheral vessels, reduces the amount of blood in the internal organs. At the onset of menstruation the effect of this on the engorged uterus is especially marked, and the individual becomes conscious of the change. As there is no inflammation in the uterus, the rule of keeping an inflamed organ at rest does not apply here, and it seems only reasonable to expect that exercise, which stimulates the circulation, should prove to be the best remedy for any symptoms arising from the congestion.

This method of dealing with dysmenorrhoea seems to be more practised in America than in England. In Dr. Engelman's presidential address[2] before the American Gynecological Society in 1900 the beneficial effect on menstruation of exercise and physical training among college students, as revealed by his exhaustive investigations, is brought out very definitely. Dr. Clelia Duel Mosher,[3] advocates special exercises of the abdominal muscles for the treatment of dysmenorrhoea, and describes how pain, excessive flow, nausea, and headache have yielded to this treatment in an interesting series of cases. Dr. Mosher does not, however, recommend that schoolgirls should be permitted to continue their regular gymnastics or athletics, though she allows that women with more mature judgement may find that they can do so with impunity.

Periodicity.

Irregularity.—It is striking in what a large proportion of the girls the flow is irregular. When they are first interviewed the number is nearly half (48 per cent.), and it remains high even after one or more years. The figure obtained by Dr. Chisholm is 16.2 per cent. The difference must be largely due to the fact that my investigations are

among girls the large majority of whom are at boarding school, and consequently affected by change of environment. It seems that there may be some advantage connected with an irregularity of the flow in young girls, since dysmenorrhoea is associated with regular menstruation in a greater proportion, 66 per cent., than it is with irregular menstruation, where the percentage is 34.

The Effect of Study on the Regularity of the Flow.—It is still a matter of common belief that education in girls has a harmful effect on the functions of the generative organs, and that the amenorrhoea which so often occurs as soon as a girl goes to school or college, after perhaps years of regular menstruation at home, is an indication that she is using her brain to the detriment of her health, the first organs to suffer being the generative organs. It certainly is a very common thing for amenorrhoea to set in for three months or more after a girl arrives at the school which supplies me with my data. But it is also a common occurrence among servant girls going from the country to situations in a town, and occurred frequently among hospital nurses who went abroad during the war; yet in both these cases there is no change in the character of the work, nor any greater mental strain. In connexion with this point it was of interest to compare the frequency of the occurrence of amenorrhoea among the boarders and the day girls. It was found that whereas it occurred during the first term in 24 per cent. of the boarders, it was only present in 5 per cent. of the day girls, although the mental strain is no greater for the boarders, but is, in fact, undoubtedly less on the whole, owing to the stricter régime allotting fixed hours for recreation and sleep. The only girls in whom there is a tendency to overwork are those studying for an examination, and from this point of view a record has been kept as to the nature of each girl's work. The total number of girls reading for public examinations was 297; of these the number who developed amenorrhoea during their period of study was eight—that is, 2.6 per cent.—and these, with one exception, were boarders, some of whom began examination work on entering the school, and were therefore liable to temporary amenorrhoea owing to change of environment. Hence we may conclude that whatever the cause of the amenorrhoea in the 29 per cent. of the cases examined may have been, it was not due to mental strain. In a few cases the amenorrhoea was associated with chlorosis or other signs of ill health, but this was very exceptional, only two cases being noted among the candidates for examination.

Dysmenorrhoea.

Whereas the boarders are more subject to amenorrhoea, dysmenorrhoea is relatively more frequent among the day girls. If under the term dysmenorrhoea are included all conditions of pain, discomfort, and malaise, the percentage of cases among those who have been a year or more in the school is 3.7 among the boarders and 11.3 among the day girls.

The Relation between Dysmenorrhoea and Study.—Of the 297 girls working for examinations there were seventeen—that is, 5.7 per cent.—in whom dysmenorrhoea began, or was accentuated, during the period of study. From this it cannot be concluded that study *per se* is the cause of the dysmenorrhoea, especially in view of the fact that the proportion of sufferers among the examination candidates is smaller than that among the total number of girls in the school who have reached the age of puberty, the relative figures being 13 per cent. and 15 per cent. It must be remembered, too, that if a girl is pressed for time, the first things she gives up are her games and walks. This is followed at once in some cases by constipation, pelvic congestion, and dysmenorrhoea. Among those who are my own patients the dysmenorrhoea has yielded at once to the taking of more exercise without any alteration in the course of the study. I would suggest, therefore, that pressure of brain work affects menstruation adversely only in so far as it encourages sedentary habits.

Relation of Dysmenorrhoea to Social Position.—That painful menstruation is more complained of among women of the leisured and educated classes than among those of the working clases is doubtless the experience of most general practitioners. The reason generally given is the increased susceptibility to pain brought about by careful nurture, and it is suggested that this increased sensitiveness is one of the prices paid for higher civilization. It is said that dysmenorrhoea is unknown among savages. Statistics verifying this statement are not available, but since such a large proportion of carefully brought up girls menstruate without pain, dysmenorrhoea is clearly not a necessary accompaniment of civilization.

I would suggest that the greater frequency of dysmenorrhoea among the well-to-do is the result of the enforced inactivity to which so many of the children have to submit, owing to the anxiety of the mothers to "take every care" of their daughters during the period. In the poorer homes the natural activity of the girls is seldom interfered with, hence their relative freedom from dysmenorrhoea.

Date of Onset of Menstruation.

It is also stated that menstruation begins somewhat later among girls where the conditions of life are not good. The following table summarizes the data I obtained on this point, which, though having no direct bearing on the subject of this paper, may be of interest as it refers only to girls in whom health is a matter of primary consideration.

TABLE C.

Age of Onset of Menstruation.	Number of Girls.
9	1
10	12
11	69
12	224
13	357
14	309
15	125
16	40
17	7
18	4

CONCLUSIONS.

1. That the majority of schoolgirls are free from any menstrual disturbance.
2. That, if no unnatural restrictions are imposed, the proportion of girls free from any menstrual disturbance tends to increase.
3. That girls in normal health should be encouraged to take baths and exercise during the menstrual period.
4. That the amenorrhoea to which schoolgirls are subject is not caused by mental strain.
5. That study *per se* is not a cause of dysmenorrhoea, although if pursued to the exclusion of daily exercise it may be indirectly a contributory factor.

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THE PLACE OF MUSCLE RE-EDUCATION IN THE TREATMENT OF ANTERIOR POLIOMYELITIS (INFANTILE PARALYSIS).

BY

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SINCE the necessity became apparent for a specialized form of muscle treatment in the after-treatment of the loss of muscle function caused by war injuries, the expression "re-education of muscle" has become very familiar. The modern conception of muscle re-education as a therapeutic measure is not, however, a war product; the principles on which it is based had been elaborated and applied to the treatment of infantile paralysis several years before the war. Muscle re-education is an entity quite distinct from the routine physical therapeutic procedures of massage, electricity, passive movements, and Swedish remedial exercises. In all cases of muscle weakness it is, in my opinion, the essential procedure, and any other methods used in conjunction with it are subsidiary. It is important, therefore, that a clear conception should be held of the meaning of the term "muscle re-education."

Muscle re-education as successfully applied to the early treatment of infantile paralysis is the gradual stimulation, and slow awakening to activity, of the voluntary motor impulse which has been lying dormant, temporarily put out of action by the interruption to its path caused by the oedema, toxicity, and vascular deprivation accompanying the acute inflammation in the neighbourhood of the anterior cornual cells of the spinal cord. With the gradual subsidence of the inflammatory process, recovery more or less rapid and complete occurs in the nervous structures, and muscle re-education then aims at restoration of the continuity of the motor impulse, and the re-establishment at the earliest possible moment of co-ordination with the almost intact muscle system. To do this calls in no small degree for patience, perseverance, and experience. After the first shock of the paralysis has passed off there is much mental inertia on the part of the patient as regards voluntary movement; recovery may be taking place in the spinal cord, and yet no call to action be made by the higher centres. The receptive and propagative powers of many of the anterior cornual cells having been lost or greatly diminished, voluntary movement over a particular area is found to be impossible; the attempt is therefore given up and a flaccid paralysis of variable extent results. To start the motor machine working again in its normal physiological manner, and not merely as a reflex imitation, a mental effort is required, and this can only be accomplished if the cerebrum is capable of interpreting correctly a spoken order for a particular limb movement, and then of activating the motor cells of the cerebral cortex for the performance of this movement; in a young child who is a recent victim of infantile paralysis, the amount of mental effort required is very appreciable. It is inconceivable, however, that any mental effort on the part of a child should succeed in producing movement in a limb if all the anterior horn cells subserving motor function for that limb had been destroyed, or, to quote an expression in common use, "irreparably damaged." Clinical study shows that the paralytic sequelae of poliomyelitis have undoubtedly a tendency to recover; this, to my mind, is explained most simply by the theory of gradual recovery of the nerve cells from the effects of the inflammatory process. Microscopic pathology shows that not all the anterior cornual cells in any one area suffer equally; the destruction rarely seems to be complete. Since return of motor function, either partial or complete, can be proved to take place after an attack of anterior poliomyelitis, it is necessary to postulate either, firstly, recovery of slightly damaged nerve cells, or secondly, nerve cells with intact connexions sufficient to ensure movement remaining active at other levels of the cord. It may only be the stimulus of great necessity which makes these long connexions respond, in order to ensure that function may gradually be restored to some degree of its former vigour. Muscle re-education, while recognizing the great importance of the morbid anterior cornual cells, at the same time desires and attempts to displace them from recognition as the sole factor of importance; it refuses to be prevented by the knowledge that the nerve cells may have been grossly injured from attempting to secure recovery of muscle function. If one assumes, as is supported by much clinical evidence, that some degree of recovery of muscle function is possible in every recent (two weeks to two years) case of infantile paralysis, no effort should be spared to regard and study muscle itself as the predominant factor in this disease, and in this way to endeavour to obtain the greatest amount of recovery possible.

The Importance of Muscle.

This conception is new. Hitherto, in these conditions, muscle has been largely ignored and attention has been concentrated on the pathological processes in the nervous system. Muscle must now be restored to its rightful and prominent place in the treatment of disorders of the neuro-muscular system. To make careful, exceedingly painstaking, and accurate diagnoses of the site of the nervous lesion may be an intellectual pastime, but it alone is of no value from the point of view of the patient's regaining muscular function. Muscle cannot be left to fight for its existence unaided: in these neuro-muscular lesions we must concentrate our treatment on muscle itself, and must adopt every means in our power to coax tiny movements back and gradually to blow into a flame the spark which has so nearly been extinguished. In poliomyelitis, after the acute stage of the illness, we are dealing with a nervous system portions of which have been more or less damaged; but with a muscular system, on the other hand, which should be nearly intact except in so far as it has been practically cut off for some weeks from its source of nervous energy. If no attempt at voluntary movement is made for some considerable time, a great and precious opportunity will have been lost. Without overlooking for a moment the importance of rest as a curative and helpful factor, I consider that rest alone will not restore muscle function, nor can it initiate it. If we rest the limbs in accurately fitting splints, and simply wait for recovery of movement to appear, both muscle and recovering nerve cell will, through their mutual absence of function, gradually react unfavourably on each other; the final result, in spite of massage and electricity, being the atrophy, fibrous degeneration, and wasted shortened limbs unfortunately so familiar in this disease. On the other hand, it would be wrong treatment, especially in the early stages of the disease, to attempt to obtain voluntary movement at the expense of grave muscle fatigue. This is a danger to be constantly watched for and guarded against; but I think it can occur very seldom, owing to the great difficulty experienced in getting a child to concentrate its efforts at muscular movement for a time sufficiently long to render fatigue possible. The ideal of treatment is a delicate co-ordination—recovery of muscle function going on hand-in-hand with nerve cell recovery. The neuro-muscular system is thus regarded from a clinical point of view as a physiological whole with interdependent parts exhibiting continual mutual action and reaction.

Rest must be combined with sane and skilled attempts at muscle re-education. At first rest for twenty-two or twenty-three hours out of the twenty-four on accurately fitting and properly devised splints is an essential part of our modern treatment of this disease; in my opinion, however, even more important is the temporary removal of the splints for a short period of time (twenty minutes to one hour one to three times daily, with adequate precautions against the positional stretching of weak muscles), for the purpose of attempting voluntary movement under the easiest possible obtainable conditions. In this connexion it is most important to remember that each weak muscle or muscle group must be very carefully studied, so that when the attempt to obtain movement is made advantage can be taken of every factor likely to be of help, such as, for example, leverage, direction of action of the muscle, effect of gravity, effect of working on a smooth flat surface (such as powdered cardboard); in view of the effect of fatigue, only a small amount of work should be done at any one time. There is a zero position for every muscle and muscle group—that position in which the paralysed muscle and its healthy opponent are in a state of equilibrium. This is the position in which muscle re-education should be begun each day and in which the limbs should be rested. Mackenzie, who originated the idea of this zero position, states also that a biological law underlies the recovery of a so-called paralysed muscle. Muscle or muscle group action is a complex function, one made up of several separate activities; the loss in the acute stage, and consequently the later recovery, follow in a definite ancestral or evolutionary sequence. According to this view one cannot regain all the functions of a muscle at once, even to a small extent, but by re-education one can gradually obtain them all, and finally then increase their strength of action. For example, the quadriceps femoris group, the extensor of the knee-joint, may, if affected by infantile paralysis, be able to straighten out the flexed knee when the patient is lying down, but be quite unable to keep the knee extended when an attempt is made to lift the heel off the bed. Similarly the flexors of the elbow may just manage to bend the elbow to a slight degree when the patient is lying down and movement is made along a smooth flat surface, but utterly fail to bend it when the arm is hanging by the side. The action of gravity associated with man's assumption of the upright position is chiefly responsible for these differences of functional activities.

The following case illustrates these considerations:

M. L., aged 6, was brought to me in January, 1920, for paralysis of her left leg and foot, left arm and right arm. The infection had occurred on October 5th, 1919, and thus I saw her

nearly three months later than I should have wished; especially in the case of the upper limb, early diagnosis and immediate treatment are of vital importance. I was informed that the paralysis had originally been more extensive, affecting the neck muscles also; there had been some slow improvement, most marked in the neck muscles, but also apparent in the left hand and left leg, but this appeared to have ceased. Massage was being given once daily, but no splints had been ordered, and no attempt had been made at re-education. On examination, both arms were found to be paralysed—the right completely, while on the left were present weak movements of the hand and wrist only, movements of fingers being good, but opposition of thumb to fingers weak. Walking was possible, but there was a definite limp with drop-foot on the left side, also hyperextension of the knee and some eversion of the foot. From clinical experience of this disease, I considered that I was quite justified in recommending treatment, but I was very guarded in my prognosis, especially as regards the right arm and hand. To my mind the essential movements to be recovered were abduction and elevation of the arms at the shoulder, flexion of the forearm, and supination of the hand, as well as dorsiflexion of the foot and extension of the knee. Before re-education could be attempted, however, some means of procuring anatomical rest had to be devised, especially for the arms. It was obvious that the dragging weight of the upper limbs was rapidly causing atrophy of the shoulder girdle muscles, and that unless this weight were removed the child would never again raise her arms (there is less justification for leaving a shoulder unsupported in a case of paralysis than there is for the non-setting of a fractured humerus). A double right-angled arm abduction splint of light iron was fitted to the patient's upper limbs. (So far as I am aware, this is the first reported case of a double-arm abduction splint having been used in the treatment of the paralyses caused by this disease.) By its means anatomical rest was given to the shoulder girdle muscles—to the deltoid muscle especially, but also to the flexors of the forearm and the supinators, as well as the hand muscles. The splint, so arranged that mid-supination was the resting position, was worn continuously, being put on after the morning re-educative exercises and taken off at night; it was not found possible to get it worn in bed. It is necessary to lay great stress on the importance of the right-angled abduction arm splint in the treatment of infantile paralysis affecting the upper limb—first, because adequate rest for arm muscles has not previously been sufficiently insisted on, or rather has been conspicuously neglected; and secondly, because of the necessity for overcoming the objections of the parents and the child to the wearing of a somewhat cumbersome apparatus. Rest for the left leg and foot was obtained by ordering, for twelve months from the onset, no walking and very little standing. To prevent deformity a special day and night shoe was provided, designed to keep the foot at a right angle and to prevent eversion or inversion; this was extended to above the knee, with a pad under the knee to allow of a few degrees of flexion. Active movements, after being originated by me, were helped and supervised by the mother twice daily for a variable time, depending mainly on the child's sense of fatigue; all movements were done lying down, and a constant endeavour was made to find easy limb positions. The exercises for the leg and foot were comparatively simple, being mainly concerned with developing the tibialis anticus and the quadriceps. Progress was uninterrupted; walking, when allowed, can now be performed in practically a normal manner. With regard to the arms the problem was much more difficult, but great perseverance by mother and child eventually produced the result that both arms could be abducted and raised above the head; flexion at the elbow could be obtained in both when the patient was lying down, but only to a comparatively small degree on the right side. Apart from a little flexion at the wrist, no further movements have occurred in the right arm, and the prognosis as regards the hand is still very uncertain. On the left side practically normal movements have been obtained, including pronation and supination of the hand, but the hand and arm cannot yet be raised above the shoulder when the child is more than half sitting up. The action of gravity then comes into play, and the muscles are not yet sufficiently strong to overcome it; the principle of gradual acquisition of function is being followed, however, and the child is being elevated stage by stage on pillows (this gradual elevation is the only method by which weak shoulder girdle muscles can be slowly re-educated to perform their normal natural functions). The improvement effected by rest and muscle re-education in the case under review has been continuous and considerable, and in my opinion no other combination of treatment could have produced results at all comparable.

The Immediate or Ideal Treatment.

For the treatment of infantile paralysis to be placed on a satisfactory footing there must be general recognition of the two guiding principles of immediate anatomical rest and of scientific muscle re-education, both to be applied at the earliest possible moment. Infantile paralysis being a notifiable disease, and the future of sufferers from it being of such grave importance to the community (a cripple is a constant charge on the State), it is advisable that parents of children affected should be given by the health authorities printed directions explaining how rest, especially for the arms, can best be obtained. The day is past when we can stand calmly by and regard infantile paralysis somewhat in the light of a visitation or punishment; as a scientific profession we can no longer be content to give the hopeless and helpless prognosis "Nothing can be done." One requires to see very few of the complete arm or upper arm old cases of infantile paralysis to realize how miserable is the future of a young subject with both arms paralysed; wasting, shortening of the limbs, subluxation of the shoulder-joints owing to deltoid atrophy, and general disablement, possibly combined with a deformed leg or legs, make death almost preferable. If the lines of treatment above indicated are followed, much that is hopeful and cheerful can be safely promised.

Conclusions.

It is endeavoured in this paper to show that each and every child surviving the first onslaught of infantile paralysis can be assisted to regain muscle power; a few may remain permanent cripples, in spite of every care, but if treatment is begun at once and properly carried out the majority should recover more or less completely. The paralysis is not the disease; it is the obvious sequela. Our aim in treatment is, therefore, not the cure of the disease but the restoration of function; this must be begun at once, before postural defects have occurred, or fibrous changes in the essential structures have taken place. Rest must be given immediately; muscle re-education should be attempted as soon as we can reasonably be sure that the inflammatory process has ceased, which may be at the end of the first week. The clinical signs will be absence of pain, tenderness, or pyrexia. We must remember that unless guided volitional effort takes place, limbs may hang helpless which have, unknown to the individual, recovered a great deal of their power. Whatever may be the explanation of the changes in the spinal cord, it is most important for the physician to realize that the muscles, if only they are handled correctly, will show a large percentage of recovery. We can never tell in any individual case what the extent of that recovery may be, and it is the practitioner's business to exploit it in every case to its fullest capacity. It is essential that the attempt at muscle work be made under the easiest possible physical conditions; there must be no fatigue, and after attempting to work the muscles must be at once adequately rested in the correct anatomical position. Children and parents very soon take an intense interest in every detail of the treatment, especially if in the case of the former an element of play or game can be introduced in the exercises to vary the monotony. The three cardinal points of treatment are: (1) anatomical rest; (2) muscle re-education; (3) general care of the patient, particularly as regards warmth of the limbs, light massage for a short period preliminary to the exercises, careful superintendence of the whole life of the child, and the avoidance of fatigue and strain.

Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

ACUTE INTESTINAL OBSTRUCTION CAUSED BY A HERNIATION OF SMALL INTESTINE INTO THE PARADUODENAL FOSSA.

THE following case is of interest for several reasons: (1) the rare occurrence of the condition; (2) the insidious onset and gradual development of the symptoms of obstruction; (3) the ease with which the obstruction was relieved; (4) the rapid convalescence and the absence of shock, which shows the importance of using all anti-shock measures we have at our disposal in dealing with such cases.

I. H., aged 11 years, had complained of a feeling of discomfort almost amounting to pain after coming home from school. Her father, who had some knowledge of medicine, applied massage of a rather violent description to her abdominal wall, hoping by this means to procure an action of her bowels. As this failed, enemata were given, the result being a very slight action dark in colour. On the following day the discomfort and pain were exaggerated, she felt sick, could not eat, and the bowels had not moved, though she had passed some flatus. I saw her in the afternoon, with Dr. E. W. Sharp of Bradford, and found the following: The child was pinched about the face, her tongue was moist and slightly coated. She had not vomited, and she complained of an indefinite pain in her abdomen; the abdomen was not distended, there was a slight general rigidity, it moved with respiration, but there was indefinite

tenderness on the left side, above the level of the umbilicus. Thinking that the condition might be due to some indiscretion in diet we decided to watch the case. Two days later her condition became much worse. She had abdominal pain, distension, vomiting, and her bowels had not acted, and no flatus had been passed. She was seen on this occasion by Dr. Wrangham of Bradford, who diagnosed intestinal obstruction and recommended immediate operation. I saw her the same evening (July 3rd, 1920) in a nursing home, and found the abdomen very distended and tympanitic. She was vomiting, and peristalsis was plainly visible through the anterior abdominal wall.

Laparotomy was performed, and on opening the peritoneal cavity some slightly turbid fluid escaped. The junction of the distended and collapsed small intestine was quickly found, and at this point a small loop of the gut was found to enter the paraduodenal fossa, and obstruction was absolute. The intestine was removed from the fossa without difficulty and the fossa was closed by two stitches of catgut, although there was plastic lymph present which would probably have obliterated it without the aid of stitches. As the intestine had not lost its lustre at the point of obstruction, and as a wave of peristalsis passed across the constriction, and seeing that the distended gut contracted when stimulated with a warm towel, the abdominal wound was closed in three layers without drainage. Subcutaneous saline was given throughout the operation. The child was bandaged in cotton-wool, and all the manipulations necessary were carried out without delivering the gut. The operation lasted seventeen minutes.

Convalescence was uneventful, there was very little shock, and recovery has been complete.

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A CASE OF EXTRAUTERINE FETATION PRESENTING IN THE VAGINA.

IN July, 1918, I attended a woman who appeared to be suffering from a miscarriage. The patient, a multipara, thought she was six months pregnant; she complained of almost continuous pain, and had a red vaginal discharge. The head of the fetus could be felt through a thin bag of membrane, but I found the uterus little, if at all, enlarged to the left of the presenting mass, and distinctly separable from it. I perforated the membrane (which was the thin attenuated vaginal wall) with my finger, and delivered the fetus, which appeared to be of about five months' development, and which had evidently been dead some time. The placenta was removed with some little difficulty, leaving a large ragged hole in the right vaginal fornix. There was a little haemorrhage, and the patient made a good recovery. I believe this to have been a case of extrauterine fetation which developed and came down between the layers of the broad ligament.

Taunton. ARTHUR E. JOSCELYNE, M.D., M.R.C.S.

A CASE OF URINARY SINUSES.

THIS case came under my care on account of the illness of the general surgeon of the hospital. I must make the remoteness of this sort of surgery from my own sphere the excuse for regarding as an exceptional case what may be fairly familiar to genito-urinary surgeons.

A Badawen complained of passing urine and stones from three openings in his right thigh. The sinuses were situated in Scarpa's triangle, 2½ in. below the origin of the adductor longus. Four years previously he had had a bullet wound, with entrance 1 in. to the right of the symphysis pubis and exit at the lower border of the left gluteus maximus, below the ischial tuberosity. Much blood was passed by the urethra that day; subsequently there was swelling on the inner side of the thigh, which burst with formation of the urinary sinuses. After about three months there was complete cessation of urination through the penis; later he began to pass small stones from the sinuses. His stricture was impassable. A probe in the sinuses was guided to the inner part of Poupart's ligament. There were thickening and contraction of the subcutaneous tissue about the openings and towards the pubic bone, but that about the roots of the penis appeared natural. The thigh was kept flexed, and the man could only limp along with the aid of crutches. Wheelhouse's operation was done. A probe passed through the stricture (in the membranous urethra) met with grating. On the proximal side we found one stone as large as a pigeon's egg and about a dozen as large as beans. The patient pulled out his catheter in the night; a large metal one was then passed and fastened with a stitch; this was changed every three days for nine days, and he was then catheterized for three or four days. Now he is passing urine by the urethra only, he is able to walk, and he is growing fat. I regret that I was unable to satisfy my curiosity as to the complete route of the sinuses. The man said he had never suffered from gonorrhoea.

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Reviews.

TROPICAL OPHTHALMOLOGY.

NOT so very many years ago the number of really useful English books on ophthalmology was by no means large, and it is an eloquent testimony to the advance in our knowledge of the subject, and the changed conditions in recent years, that the publication of a book on the tropical aspects of ophthalmology should satisfy a very real need. Lieut.-Colonel ELLIOT, in *Tropical Ophthalmology*,[1] not only gives an account of the common diseases of the eye met with in the tropics, and places his unrivalled experience of the most suitable methods of treatment at the disposal of the practitioner, but at the same time gives a description of the rarer forms of disease, and this renders the book indispensable to the specialist in the subject. In remote parts of the empire the medical man has to be "an all-round specialist," and he will find few branches of medicine and surgery of greater value than ophthalmology in helping him to gain the confidence of the inhabitants. Nor must we forget that tropical disease, as a minor consequence of the war, is seen in the United Kingdom much more frequently than formerly.

As stated in the preface, the object of the book is not only to make information on the subject readily accessible to the worker, but to stimulate him to study the many little-understood tropical conditions that affect the eye. "We see what we have been trained to see, and we very often miss the obvious phenomena for which our minds are unprepared." Parasites, glare, dirt, and ignorance are the chief factors producing eye diseases in the tropics as elsewhere, and all of these are fully discussed. The ocular diseases caused by parasites peculiar to the tropics are of the greatest interest, and the author has conferred an inestimable boon on all workers by collating the available information on the subject and rendering it not only readily accessible but a pleasure to read. A glance at the bibliography will give some idea of the labour required to write a pioneer book such as this; information must be painfully sought for in papers written in many journals and in many languages.

The author paints a vivid picture of the tropical "hot weather" season:

> "It is very difficult for anyone who has not actually lived the whole year round in a tropical country to appreciate the influence of heat, wind, and dust. The minds of those of us who have done so go back to those first days of each year, when the covers of the books on our shelves began to curl up backward, when, as we emerged from our bungalows, the heat of the breeze struck like a blow, painfully drying up the skin, and suggesting a blast from a furnace. . . . Then, as the year moved on in a succession of days, each one of which seemed hotter than the last, every blade of grass disappeared from our compounds (gardens) and from the maidans (commons), till the earth's surface assumed one brown, baked hue, variegated only by the interlacing, gaping cracks in the soil. The dust-devils, dancing down the road, and the blinding storms of wind, charged with desiccated and faeces-laden earth, come back to memory like the incidents in an evil dream."

Colonel Elliot's most practical notes on operations for senile cataract and glaucoma will, naturally, be of the greatest value to surgeons practising in the tropics. His personal preference is for a capsulotomy operation combined with irrigation, and this is strongly recommended for the beginner, who, as he acquires experience, may decide later what type of operation is likely to be the most successful in his hands. The remarks on prophylactic trephining in countries where the ignorance of the general population is a marked feature, are of considerable interest, and a strong case is made out for this procedure. Colonel Elliot does not, however, contend that prophylactic trephining should be employed indiscriminately, but that the surgeon "must weigh carefully the circumstances of each case and decide it on its merits, conscious of the responsibilities that attend either action or inaction."

The chapter on quinine poisoning is of importance to the general practitioner, and there are interesting and valuable sections dealing with hospital management. The success of the surgeon in remote parts depends not only upon his dexterity and knowledge, but also, in no small part, on the care which he devotes to hospital administration. The

[1] *Tropical Ophthalmology*. By Robert Henry Elliot, D.Sc., M.D., B.S., F.R.C.S., Lieut.-Colonel I.M.S. (retired). London: Henry Frowde, and Hodder and Stoughton. (7 plates, 117 figures. 31s. 6d. net.)

paragraph on the Indian crow gives an account of one of the minor difficulties which confront the head of an Eastern institution:

"No one who has not watched these birds can form a just idea of the pest they constitute in a hospital where many of the patients are blind. Even in other institutions they have a very evil reputation as shameless and persistent thieves, but their knowledge of the limitations of the blind seems almost satanic."

Colonel Elliot makes a powerful appeal for a better understanding by the civilian executive of the aims of the medical officers and the value of their work. Parsimony and petty jealousy are the deadly sins which so often hamper progress, and he attacks these with courage and conviction.

The book is extraordinarily well illustrated. Seven coloured plates are included; these and the reproduction of the numerous photographs are quite exceptionally good. The author makes a most generous acknowledgement of the services of those who have contributed information and material. He may be congratulated upon having produced a pioneer book; the benefit he has conferred on all workers in the tropics should be some compensation for the vast labour incurred in writing it.

SHIBBOLETHS OF TUBERCULOSIS.

FROM the earliest times to the present day the progress of knowledge has been persistently retarded by fixed ideas. Everyone forms his own conception of any new group of facts, but in most cases one or two such facts stand out prominently and throw others into the mental background. Thus it has been in the case of tuberculosis. So much has been stated and written upon the subject that most adults of either sex have formed opinions more or less stereotyped upon the salient points, and are apt to hold on to them with marvellous tenacity in spite of the teaching of later experience, which in many cases has proved their fallacy.

The tendency to hold fast by preconceived opinions is not limited to non-medical persons, but is shared, though perhaps in less degree, by many medical practitioners, and this tendency has reacted unfavourably upon a vast number of patients who have been subjected to obsolete forms of treatment, disappointing to themselves and disastrous to their surroundings. The appearance of a work, *The Shibboleths of Tuberculosis*,[2] specially devoted to the sweeping away of such early misconceptions as may prove harmful in practice is doubly welcome, proceeding as it does from the pen of a writer who is in a position to speak with many years' experience of life in the midst of tubercle. Dr. MARCUS PATERSON, like many others who have had a like experience in hospital and sanatorium life, has been brought face to face with most of the problems that have to be solved in dealing with consumption and the consumptive patient. Hence he speaks with authority, but at the same time supports his statements by quotation from other specialists whose published works command respect.

Dr. Paterson has attacked the subject by division into fifty-nine chapters, each one devoted to a special preconceived idea, such as we have referred to above, which in his opinion requires modification or rejection, as the case may be. Thus his opening chapter deals with an accepted "shibboleth" that it is good to sterilize milk to limit the spread of tuberculosis. In this he points out the well-known fact that bacilli are sometimes to be found in butter and cheese, and apparently does not think it worth while to destroy a part since it is not possible to destroy the whole. He suggests that the ingestion of a moderate amount of tuberculous poison during childhood may have an immunizing effect in the long run. He does not make any mention of the risk of infection by bread, which of all foods passes more directly "from hand to mouth" than any other. If it were possible to control the known sources of infection, the sputum and all milk and its products, still the air passages are at all times open to the entry of dust-borne microbes. The question of marriage of possibly tuberculous persons is discussed at length, and its difficulties are clearly pointed out. The problems of heredity, real or supposed, are solved by the conclusion that very few babies are born with tuberculous disease; some may inherit an aptitude for its development, but the greater number of children born of tuberculous parents remain free from any evidence of the disease if removed from unhealthy environment. Too great reliance must not be placed upon the results of *x*-ray examination. Active tubercle casts no shadow on the plate or screen, and it is not always possible to gauge the amount of local mischief by means of radiography.

As superintendent for many years of the Frimley Sanatorium, the author speaks feelingly with respect to the duties of the office of medical superintendent when conscientiously carried out. It must be assumed that such duties have been neglected if the management of a sanatorium can be described in the current slang of the day as a "cushy job." He shows very clearly that the work is never-ending, a trial to the temper as well as to the physical powers of endurance. Being entirely convinced as to the effect of auto-inoculation by means of graduated exercise, he regards it as the one really effective means of arresting the disease, and hence he has but little to say in praise of the many forms of climatic treatment in which the air of the mountains or of the sea is at present utilized. The sanatorium, which has of late come in for a good deal of disparagement, can only be effective when put to its right uses. If employed as a home for consumptives it will probably do more harm than good, but where it is used as the best means of active treatment by auto-inoculation the results, he considers, fully justify its maintenance.

A very large number of minor "shibboleths" are in turn considered in this work, which we strongly commend to the notice of those who have the difficult task of dealing with consumptives in private practice. It may be equally commended to the consideration of the patients also.

[2] *The Shibboleths of Tuberculosis.* By Marcus Paterson, M.D. London: John Murray. 1920. (Demy 8vo, pp. 329; 2 figures. 10s. 6d. net.)

LOCAL ANAESTHESIA.

THE subject of local anaesthesia is exhaustively expounded by Dr. GEORGES CANUYT and Dr. J. ROZIER in their work on local and regional anaesthesia in oto-rhino-laryngology.[3] Most appropriately a preface has been contributed by that great master of laryngology, Professor Moure of Bordeaux, for not only was he foremost in the introduction of the method in Europe, but the work on which the present volume is based comes from his own school.

The first chapter of the book is devoted to a detailed general account of local and general anaesthesia without any reference to special regions. This chapter is admirable; the methods, principles, advantages and risks are well described. In the later chapters the applications of the methods to the surgery of the nose, including plastic operations, the larynx, the ear, the palate, the tonsils, the tongue, the thyroid gland, the lips and the lower jaw, are described. It must be understood that the authors describe an extension of these methods, which goes far beyond the limits of the usual practice in this country. Whilst the technique of intranasal and intralaryngeal operations owes everything to local anaesthesia, it is at least doubtful if such methods are the best for the major external operations, such as those on the frontal sinus, thyrotomy, and excision of the larynx. This is, however, an excellent reason why the opinions and experience of the authors should receive the most careful study and consideration, more especially as they are expressed with scientific moderation and with the precision which seems almost peculiar to French writers.

In the employment of regional anaesthesia anatomical knowledge is essential, and the anatomical descriptions are detailed and accurate. So much space, however, is devoted to this subject that the reader may well feel that he might have been left to refer to Testut or Cunningham, though the book is thus made complete and self-contained. No one interested in the advancement of otology and laryngology should fail to make himself acquainted with the claims of this school, but the book may well make a wider appeal to surgeons, for the authors take a broad view of their subject and deal with many points of importance and interest in general surgery.

Instillation of drops of cocaine into the conjunctival sac is the routine anaesthetic for use in cases of cataract in all

[3] *L'Anesthésie Locale et Régionale en Oto-Rhino-Laryngologie.* By Drs. Georges Canuyt and J. Rozier. Paris: Gaston Doin. 1920. (Roy. 8vo, pp. 199; 117 figures. Fr. 14.)

parts of the world, and a similar method of obtaining anaesthesia is extensively employed in dealing with other ocular diseases, in cases in which the eye is quiet, free from injection and from signs of raised intraocular tension. Dr. Duverger, in his work on local anaesthesia in ophthalmology,[4] presents the case for a more extensive use of local anaesthesia by the method of injection and deep infiltration of the tissues with solutions of novocain and other cocaine derivatives combined with solutions of adrenalin. He claims that when the drug is properly injected a perfect anaesthesia can be obtained for all ophthalmic operations, including such procedures as excision of the lacrymal sac, excision of the globe, squint, operative treatment of acute glaucoma, and for operations on inflamed painful eyes; those who have made use of this method will certainly agree with him in his claim. The book is an excellent one; it gives a historical section, an anatomical summary, and precise instructions as to how to employ the method advocated in the various diseases of the eye. The illustrations show very well the spots at which the needle is to be inserted. It is a work that will be a useful addition to the library of the ophthalmic surgeon.

THE SCHOOL CHILD.

To the "English Public Health Series," edited by Sir Malcolm Morris, Dr. Joseph Cates, M.O.H. St. Helens, has contributed a sixth volume, *The Welfare of the School Child*,[5] which is well worthy to take its place with those already contributed by the editor, Dr. Scurfield, Dr. W. G. Savage, Dr. John Robertson, and Dr. Mary Scharlieb.

In his introduction Dr. Cates emphasizes the fact that the condition of the school child is a result of many antecedent conditions, parental and infantile. The infant carries into school the result of five years of home life, and for good or evil that period will be largely responsible for the physical and mental condition of the entrant to school. During the nine months of ante-natal gloom, too, the career of the future infant may be seriously crippled. A high infant death rate in a community implies in general a high death rate in the next four years of life, while a similar association is found between low death rates at both age periods. School children suffering from malnutrition commonly come from families where there has been a relatively high rate of infant deaths, and it may be expected that any condition likely to bring about infant death will certainly entail a large amount of sickness in childhood. With this clearly in view the author proceeds to consider the determining causes of what he considers the worst of school defects—malnutrition. His conclusion places the blame on defective environment:

> Until the insanitary areas are swept away and the dispossessed inhabitants decently re-housed, malnutrition will be prevalent in public elementary schools. Every house should have as a minimum, water supply within the house, a sink, a wash boiler, and a bath, the means for adequate ventilation and light in every room, fly-proof storage of food, a fly-proof receptacle for house refuse, a water-closet, a backyard completely paved, and the occupants must be taught how to make the best use of these means of cleanliness provided.

The book in its several chapters deals with dental disease, defects of vision, hearing, and speech, heart and lung disease, minor ailments, the cripple child, the mentally abnormal child, school buildings, the school annexe, and special schools. Each subject is treated in a simple and clear fashion, and the effect is to provide a very useful and satisfactory introduction to the subject, suitable for beginners in school medical inspection and for the head teachers of schools, upon whose clear understanding of the conditions and needs of their charges rests in great part the success of school medical work.

NOTES ON BOOKS.

Drs. Robert Hutchison and Harry Rainy's well known *Clinical Methods*[6] has in its twenty-three years of existence won a secure place in the confidence of medical readers. The present—the seventh—edition fully maintains its past reputation and has been thoroughly revised and brought up to date. There are three new coloured plates showing the blood in malaria, the fundus oculi in various conditions, and the tympanic membrane in health and disease. The section on the circulatory system is now illustrated by a number of electro-cardiograms selected by Dr. G. D. Mathewson from the collection of the Clinical Medicine Research Laboratory of the Royal Infirmary, Edinburgh. In the section on the examination of the blood, in which the authors have had the advantage of advice from Dr. P. N. Panton of the London Hospital, a reference might perhaps have been made to Professor Arthur Hall's convenient modification of the Tallquist method of rapidly determining the percentage of haemoglobin. This popular manual contains the maximum amount of information in the smallest possible compass.

Dr. C. B. Ker's large and handsome monograph on *Infectious Diseases*[7] offers medical practitioners and the richer medical student an admirable practical textbook of "fevers," the thirteen most prominent of which are discussed at full length, and with the knowledge accruing from a very considerable experience, in this volume. The first chapter gives an introduction to the subject, discussing bacteriology, immunity, anaphylaxis, and kindred topics of importance, in a simple manner that is readily intelligible as well as adequate. The next thirteen chapters are devoted to the same number of specific infectious disorders, enteric fever in particular being discussed with a great abundance of detail. The last chapter contains an account of various fever-hospital problems, the coexistence of infectious diseases, cross-infection, the supervention of sepsis, and return cases. Dr. Ker writes clearly, and from the practical point of view is to be congratulated upon the fullness of his information in the matters of prevention and treatment. The book is well illustrated with charts and plates, some of the latter being excellent direct colour photographs well reproduced by the printer, who, for the rest, has done his work excellently. The volume is to be cordially recommended to the attention of students and practitioners of medicine.

The Influence of Man on Animal Life in Scotland: A Study in Faunal Evolution, by Dr. James Ritchie,[8] of the Natural History Department of the Royal Scottish Museum, and therefore not the eminent bacteriologist of the same name, is an attractively written and beautifully illustrated book, well suited for holiday reading in the country, especially if the holiday be taken north of the Tweed. It is based on lectures given in December, 1917, to a general audience at Aberdeen under the Thomson Lectureship in Natural Science. The influence of man's acts is only one of several factors bearing on the instability of a country's fauna, and, as it was necessary in the investigation of this problem to select a fauna of manageable compass, that of Scotland had obvious advantages. Part I deals with man's deliberate interference with animal life, such as the domestication of animals, their protection, intentional destruction, and the purposeful introduction of new animals. Part II, on man's indirect interference with animal life, discusses the influence of destruction of forests, and the unconscious introduction of parasites, such as fleas, rats, wood-wasps and beetles. At the end of the book there is an interesting chapter on the recoil upon man of his influence on animal life, in which reference is naturally made to the diseases spread by rats and fleas. There is a spot map of Scotland showing the village incidence of malaria in the eighteenth century, an infliction which passed away with that century.

The Woman of Forty,[9] the most recent addition to Dr. Edith B. Lowry's series of books on sex hygiene, is a wholesome and brightly written piece of advice to women approaching middle age. At the menopause women may, as everyone knows, do peculiar things, become estranged from their husbands, and justify the use of the term "the dangerous age" as regards their future happiness. Change from town to country life for two or three years at this critical period may save the situation and make her fit for thirty years of mature usefulness. In recommending such women not to dwell on or study their

[4] *L'Anaesthésie Locale en Ophthalmologie.* By Dr. Duverger. Paris: Masson et Cie. 1920. (Cr. 8vo, pp. 94; 19 figures. Fr. 6.50 net.)

[5] *The Welfare of the School Child.* By Joseph Cates, M.D. London: Cassell and Co., Ltd. 1919. (Cr. 8vo, pp. 154; 6 half-tone plates. 5s. net.)

[6] *Clinical Methods: A Guide to the Practical Study of Medicine.* By R. Hutchison, M.D., F.R.C.P., and H. Rainy, M.D., F.R.C.P.Edin., F.R.S.E. London: Cassell and Co., Ltd. 1920. (Fcap. 8vo, pp. 698; 157 figures, 16 coloured plates. 12s. 6d. net.)

[7] *Infectious Diseases: A Practical Textbook.* By Claude Buchanan Ker, M.D.Edin., F.R.C.P.Edin. Second edition. London: Henry Frowde, and Hodder and Stoughton. 1920. (Cr. 4to, pp. 639; 32 plates, 68 figures. £2 2s. net.)

[8] *The Influence of Man on Animal Life in Scotland: A Study in Faunal Evolution.* By J. Ritchie, M.A., D.Sc.Aberd., F.R.S.E. Cambridge: The University Press. 1920. (Roy. 8vo, pp. 566; 90 figures, 8 maps. 28s. net.)

[9] *The Woman of Forty.* By Edith B. Lowry, M.D. Chicago: Forbes and Co. 1919. (Cr. 8vo, pp. 203. 1.75 dols.)

ailments, Dr. Lowry wisely warns them to avoid the habit of making every conversation with a friend an "organ recital," for to do so is to advertise the advancing years. The chapter on general health contains much sound advice about seeking medical supervision to prevent illness, and contains several good illustrative cases showing the value of *x* rays in detecting focal infection at the roots of the teeth. Enthusiasm, mental activity, and sympathetic interest in others are among the qualities the woman of 40 should cultivate to save herself from an unhappy and premature old age.

In his account of *Venereal Disease and its Prevention* Dr. R. LEBLANC[10] writes in simple language for the lay public an essay on preventive medicine, and, as he expressly points out, not one on morals. The first part contains an elementary sketch of the anatomy and physiology of the sexual organs; gonorrhoea is described in Part II, and then syphilis is dealt with. Prevention in men and in women is then described, and the appendix contains the British Venereal Diseases Act, 1917, and the new German regulations with regard to venereal disease, 1918. The author is an earnest advocate of preventive methods, and is convinced that the best and perhaps the only means of getting at the root of the whole question is a thorough education of the public in the problems of venereal disease.

Mr. A. W. KNAPP'S book on *Cocoa and Chocolate*[11] is a comprehensive work for the general reader who wants to know all about the cacao bean and its products. Beginning with a sketch of the history of cocoa (more correctly from the Mexican and historical point of view written cacao some four hundred years ago) and chocolate, the author describes the cultivation and harvesting of cacao, the manufacture of the cocoa and chocolate known to us all, the by-products of the industry, the adulterations to which cocoa and chocolate are so lamentably prone, and the quantities in which they are produced. The book is well written and illustrated.

[10] *Venereal Disease and its Prevention.* By R. Leblanc, M.R.C.S., L.R.C.P., late Pathologist at No. 1 Stationary Hospital. Letchworth: G. W. Browne. 1920. (Pp. 158; 2 figures. 7s. 6d.)

[11] *Cocoa and Chocolate: their History from Plantation to Consumer.* By Arthur W. Knapp, B.Sc.Birm., F.I.C., B.Sc.Lond. London: Chapman and Hall, Ltd. 1920. (Demy 8vo, pp. 219; illustrated. 12s. 6d. net.)

THE HISTORY OF SCIENCE.

REPRINTS OF EIGHTEENTH CENTURY PAPERS.

UNDER the direction of M. Solovine, the firm of Gauthier-Villars of Paris have commenced the publication of a collection of essays of fundamental importance in the development of modern science. The collection is published under the general title of *Les Maitres de la Pensée Scientifique.* As is truly pointed out in a general preface, it is now often difficult to consult the original writings of men the results of whose investigations have become the commonplaces of textbooks. The series now projected is designed to "render accessible to men of science and to the educated public the original text of writings which mark the successive stages in the slow and laborious construction of the great edifice of science." There can be no doubt that the aim is excellent, and we can only hope that the programme is not too ambitious for fulfilment. At the same time it must be said that, judging from the two sets of memoirs before us, the lack of notes explaining the terms and phrases used in the eighteenth century may prevent them from being understood by the general reader. The memoirs to be noticed are those of Lavoisier on respiration and transpiration,[1] and those of Spallanzani on the animalcules occurring in infusions.[2] In both instances short biographical notices are provided.

Lavoisier's work with regard to the nature of respiration was of first-rate importance, and it will be interesting to indicate its relation to the movement of scientific thought in his day. Lavoisier was a wealthy man, one of that company of financiers (fermiers-générals) to whom the French State conceded for a fixed annual sum the right of collecting the indirect taxes. The system was the cause of many abuses, and one of the first acts of the Revolution was to upset it. Lavoisier was imprisoned at the end of November, 1793, was found guilty along with twenty-eight of his colleagues, and was guillotined on May 8th, 1794, when he was only a little over 50 years of age.

Lavoisier early showed interest in many departments of science, but distinguished himself especially in chemistry, a subject which he studied under Rouelle at the Jardin du Roi. In his first paper, published in 1765, Lavoisier showed that gypsum sets as plaster-of-Paris by becoming hydrated, but that when over-burnt it would not rehydrate. Next, in 1768, he read to the Académie des Sciences an essay on street lighting, which gained him admission to that body. His important work was commenced in 1772 and published in May, 1775, under the title "Mémoire sur la Nature du principe qui se combine avec les métaux pendant la Calcination et qui en Augmente le poids." A century before John Mayow at Oxford had distinguished in air a *spiritus nitroaereus vel ignoaereus*, which was used up in combustion and respiration from another gas which remained after the former had been exhausted. He pointed out, moreover, that these ignoaerean particles became inserted into metals when calcined—for example, when antimony was calcined by the sun's rays through a burning-glass, and by actual weighing he proved that there was a considerable increase in weight. But the perverse theory about phlogiston prevented Mayow's observations from being recognized.

Joseph Black (1728–1799), an assistant to Cullen in his chemical laboratory in Edinburgh, whilst experimenting, among other things, on the lithontriptic medicines, with the object of dissolving gravel and bladder calculi, discovered that what Van Helmont had called "gas sylvestre" and he termed "fixed air" (carbonic acid gas), when driven through a clear solution of lime-water, gave rise to a precipitate. The gas being absorbed by caustic lime could be weighed, and there was thus formed a means of testing the amount of gas in expired air and distinguishing it from the other gas—nitrogen.

In 1766 Henry Cavendish (1731–1810), a grandson of the Duke of Devonshire, about whose chemical education information is wanting, read to the Royal Society a paper on "factitious airs," in which he distinguished an inflammable gas which escaped when iron, tin, or zinc was dissolved in weak sulphuric or hydrochloric acid. When this gas was mixed with atmospheric air and exploded about one-fifth turned into water. In 1783, by using the principle of the eudiometer described by Hales, and adopting from Volta the exploding by means of an electric spark, Cavendish was able to demonstrate the formation of water by the combination of this gas (hydrogen) with the oxygen of the air.

In 1772 Daniel Rutherford, a pupil of Cullen's and Black's, in his M.D. dissertation, showed that if the "fixed air" were removed from expired air by caustic lime there remained a residual gas which was irrespirable and which extinguished flame. This so-called "mephitic air" was connected with nitre by Cavendish, who obtained nitric acid from the atmosphere by means of the electric spark. Lavoisier named this "mephitic air" azotic gas, or azote, to indicate its inability to sustain life; the name nitrogen was given it by Chaptal, the French chemist.

It was in 1767 that Priestley (1733–1804) began his chemical experiments with "fixed air" produced by fermentation in a neighbouring brewery. In 1771 he made a first-class discovery by proving that plants absorbed carbonic acid and gave out oxygen. But these and his further experiments were entirely confused by his adherence to the phlogiston theory, which gave a reverse explanation to his discoveries. In 1772 he introduced the pneumatic trough for the collection of gases over mercury. In 1774 he made the so-called "mercurius calcinatus," that is, oxycarbonate of mercury, or red oxide of mercury, called "red precipitate," which he then placed in a close vessel and heated by the aid of a burning-glass when there was given off what Priestley called "dephlogisticated air." Priestley later asserted that, being in Paris in October, 1774, he had informed Lavoisier of his experiment. Be that as it may, Lavoisier proved by his *Mémoire* in May, 1775, that mercuric oxide when heated by itself gave off gas which corresponded with the respirable portion of

[1] *Mémoires sur la Respiration et la Transpiration des Animaux.* By Antoine-Laurent Lavoisier. Les Maitres de la Pensée Scientifique. Collection de Mémoires publiés par les soins de M. Solovine. Paris: Gauthier-Villars et Cie. 1920. (Double fcap. 16mo, pp. 74. Fr. 3.)

[2] *Observations et Expériences faites sur les Animalcules des Infusions.* By Lazare Spallanzani. Tomes I and II. Les Maitres de la Pensée Scientifique. Collection de Mémoires publiés par les soins de M. Solovine. Paris: Gauthier-Villars et Cie. (Double fcap. 16mo. Tome I, pp. 113, Fr. 3; Tome II, pp. 122, Fr. 3.)

the air; when mercuric oxide was heated with charcoal "fixed air" was produced; hence he concluded that "fixed air" was formed by a union of charcoal with the respirable air. In a further *Mémoire* in 1777 on general considerations concerning the nature of acids and on the principles of which they are composed, Lavoisier concluded that the principle which combined with metals when calcined was the principle constituting acidity, the "acidifiant" or "oxygine" principle, an essential in calcination and burning. But he went beyond the mark in assuming the "acidifiant principle," for it was quickly shown that hydrochloric acid contained no oxygen.

The foregoing is a brief account of discoveries made shortly before the memoirs now reprinted. In this communication (*Académie des Sciences*, 1777) Lavoisier stated that respiration was a slow process of combustion; a portion of the carbon contained in the blood in the lungs combined with the respirable portion of the air to form "fixed air," just as happens when charcoal is burnt. The heat produced in this slow combustion was the source of animal heat. The "fixed air" was identical with the so-called aëriform calcic acid obtained by treating chalk with acids. The so-called "mephitic air" or "azote" remained unaltered in the respired air.

The memoir on the production of heat in oxidation combustion and in animals, by Lavoisier and La Place, was published in 1780. They compared the heat produced in animals with the amount of carbonic acid gas given off in expired air. As they calculated that the amount of heat produced was greater than could be explained by the gas expired, they concluded that there was an additional source of heat, by the hydrogen in the blood combining with the oxygen of the air. They thought that the oxidation occurred in the lungs, which was a retrogression on Mayow, who had held that the contraction of muscle was due to a combustion of his spiritus nitroaereus. Spallanzani (in his *Memorie sulla respirazione*, published in 1803 after his death) proved by experiments on snails, hibernating dormice, and bats, that oxidation occurred in the tissues, oxygen which had been stored up being used. The second of Lavoisier's memoirs, here reproduced, read to the Société de Médecine in 1785, is directed to the thesis that respiration involves both a combustion of carbon to form carbonic acid, as well as of the hydrogen in the blood to form water.

The third memoir is by Seguin and Lavoisier; it related experiments on guinea-pigs under bell jars, and others by Seguin on himself. The results led them to suggest that some of the carbonic acid gas was formed in the course of digestion, and that it passed by the chyle into the lungs and so escaped.

In the fourth memoir the same authors set themselves to distinguish three processes: (*a*) the respiratory change in the lungs in which there took place a process of slow combustion with oxygen by which carbon combined to form carbonic acid and hydrogen to form water; (*b*) that of transpiration, including the loss of water and heat by the skin; and (*c*) the digestive process which supplied the blood with the carbon and hydrogen. To distinguish cutaneous transpiration from pulmonary transpiration they repeated the experiment of Sanctorius; the experimenter was seated in a weighing chair, enclosed, except for the nose and mouth, in a sack made impermeable by rubber ("gomme elastique"). In this way they compared the weight of fluid escaping by the skin in twenty-four hours and that from the lungs with the quantity of carbon and hydrogen taken in.

Animalcules of Infusions.

A French translation of Spallanzani's book relating to observations and experiments on the animalcules of infusions fills two volumes of the series. The translation is that published by Senebier in Geneva in 1786, but unfortunately Spallanzani's illustrations have not been reproduced.[3]

Leeuwenhoek, at the end of the seventeenth century, made a number of observations which were confirmed and extended by others, so that by the middle of the eighteenth century protozoa, diatoms, spores of algae, spermatozoa, and other objects of the same size were to a certain extent distinguished. The philosophers who held the theory of spontaneous generation had ceased to maintain their thesis in the case of larger living beings and plants. What could be observed in "infusions" had become the battle-ground. Liquids made by boiling or simply macerating seeds and other vegetable materials were used, and also animal materials, such as yolk of egg dissolved in water, and various mixtures with rain water, or ditch water, or sea water. These liquids were then allowed to decompose for a day or two. The most remarkable objects in these infusions were the animalculae or infusoria; some were named and others can be recognized from the descriptions—volvox, vorticella, monas, paramoecia, amoebae, rotifers, flagellate and ciliate infusoria; other objects were more vaguely termed vermiculi. But besides these there were smaller objects which had only a vibratory movement; some claimed these to be germs, others inanimate granules.[4]

In 1749 John Turberville Needham (1713–1781), a Roman Catholic priest commonly called the Abbé Needham,[5] addressed to the Royal Society his *Observations upon the General Composition and Decomposition of Animal and Vegetable Substances.* He imagined a vegetative force which existed in matter. As the result of two other forces, resistant and expansive, an infinitude of combinations could be imagined by those with a mathematical turn of mind; to others his philosophy was incomprehensible. But he was supported by Buffon, who believed that minute animals, including worms, were produced from putrescible matter.

Needham's essay was translated into French, and Spallanzani's first publication was a criticism of it; a long controversy ensued. Spallanzani commenced by confuting and ridiculing the observations by which Needham had sought to confirm his speculations. Needham had heated infusions and then let them stand with porous corks. The animalculae which then developed as the infusions decomposed were claimed as evidence of his vegetative theory. Spallanzani heated his flasks containing the infusions and then sealed them hermetically. Needham replied that Spallanzani's infusions had been overheated, that the vegetative force was destroyed, and so no animalculae developed.

Spallanzani divided the living forms in his infusions into two classes—a higher class actively moving, having a definite structure, easily destroyed by heat, and a lower class, destroyed only by much greater heat. Boiling an infusion for half a minute destroyed most of the actively moving organisms; the infusions required to be boiled for at least three-quarters of an hour to render them sterile when hermetically sealed. If boiled for a shorter period, there followed in the hermetically sealed flask a development of organisms to a degree varying with the length of time the heat had been applied. In order to establish that the lower forms which resisted heat were the germs of the active animalculae, he made the following comparisons:

Frog's eggs resisted heat up to 110° F., and a few an extreme of 133° F.; all tadpoles were killed at 110° F. Eggs of flies blown on meat bore heat up to an extreme of 138° F., but not 140° F.; the maggots perished at 108° F. Peas, lentils, wheat grains, linseed, and cloverseed were not prevented from germinating by a dry heat up to 167° F., or even as much as 212° F., but all plants from the foregoing seeds were killed at a heat above 140° F. Cloverseed even withstood boiling a little without losing the power of germinating. A few of the active animalculae survived cold at the freezing point, but not the cold of a freezing mixture, although their germs did so. The animalculae, like small animals, could not live in the vacuum produced by the exhaust pump.

The animalculae could be observed to propagate by division, also by ova which first collected within the organism. Observations made on polyps by Trembley corresponded with those in the animalculae. After an infusion had been rendered sterile by boiling, germs of the animalculae fell in from the air or penetrated a porous cork. The spermatozoa found in the testes of living animals, or in the sperm just ejaculated by the horse, were similar organisms to the infusoria. The spermatozoa were quite distinct from the granular matter amongst which they actively moved in the sperm.

[3] Professor J. G. MacKendrick gave an excellent account of the life of Lazaro Spallanzani (1729–1799) in an introductory lecture published in the BRITISH MEDICAL JOURNAL, 1891, vol. ii, p. 888.

[4] Baker, H.: *Employment for the Microscope.* London. 1753.

[5] He is not to be confused with Dr. Walter Needham, as does Garrison, *History of Medicine*, second edition, 1917, p. 318.

British Medical Journal.

SATURDAY, OCTOBER 2ND, 1920.

HUMAN METABOLISM.

THE popularity of science and the enthusiasm for it to which the war gave rise are perhaps declining, but researches undertaken in the critical years should stimulate us to build upon the foundations then laid. Amongst these pioneer investigations that reported by Professor (then Lieut.-Colonel) E. P. Cathcart and Captain J. B. Orr on the *Energy Expenditure of the Infantry Recruit in Training*[1] takes an honourable place. The authors were directed to solve a specific practical problem, namely, that of the food requirements of infantry soldiers in training under the conditions of the last two years of the war, but the results they obtained are of wider interest.

At the outset of the report a question of much importance is raised. A number of experiments (81) was made upon the basal metabolism of 9 subjects by indirect calorimetry. It appears from the protocols that although the mean (per square metre of surface per hour) was almost identical with the figure proposed by American observers, the range was wide. We collect from the records that in 9 experiments the value was from 32 to 34 calories, in 10, 34–36, in 23, 36–38, in 19.5, 38–40, in 14.5, 40–42, and in 5, 42–44 (the fractions result from distributing observations falling at the limits of the classes). Is this range due to (*a*) natural variability of the individual subjects, to (*b*) the effect of differences in previous diet, or to both factors? The authors show, in agreement with Benedict and Murschhauser, that the second factor is certainly important, a high protein diet raising the level of basal metabolism; while the data analysed by Benedict and Harris suggest that natural variability is also involved. A question which Professor Cathcart and Dr. Orr raise, but from paucity of data could not settle, is whether in averaging results one should weight by the number of experiments or by the number of subjects. They have actually adopted the former method, and, in our opinion, were justified in so doing. But the question ought to be fully answered, and can only be when a larger number of data exist for individual analysis. The problem is essentially a simple one. If we pooled a thousand measurements of the stature of adult English with a thousand measurements of adult French, the final average would be of little value. May we pool 1,000 metabolism experiments on A with 1,000 on B, external conditions being identical? Nothing like enough data exist to answer this question, but it must be had in mind when the results of such an inquiry as the present are assessed.

Turning to the results, we find, as might be expected, a great diversity in the output associated with different phases of the soldier's life. Lying down cost about 40 calories a square metre an hour, sitting at lectures nearly 50, standing at attention about the same, and standing at ease rather less. Squad drill without arms cost 88 calories, with arms 130; entrenching required 187 calories, and marching was the most costly of all. The authors assign as an average figure for route marching 258 calories and for marching in battle order 214, or with full equipment 233. They devote special attention to the subject of marching, and clearly bring out the effects of load and of velocity. The evidence that there is an optimum rate is clear; some of the data have been more closely analysed in another paper by Cathcart, Lothian, and Greenwood, while some interesting remarks are made upon the effect of changing the distribution of the load. The infantry soldier, we read, is often overloaded. "It was not infrequently the case that the load the soldier had to carry, one way and another, and, moreover, be prepared to fight at any moment, amounted to 75 to 80 per cent. of his body weight; it was actually known to exceed this preposterous figure in some instances. It is admittedly difficult to know how to deal with the problem, but it is in urgent need of solution. The infantry soldier is a fighting man; he is not a mere beast of burden."

A comparison of these results with those obtained by the same experimental procedure upon industrially employed persons is much to be desired, but unfortunately few comparative data exist. Professor Waller has published some important series of observations, but the technique was different. The nearest parallel is afforded by Greenwood, Hodson, and Tebb's work on some of the more laborious processes carried out in munitions factories.[2] Thus they did fourteen experiments on five women "labouring." The task was to remove steel filings from trays under the lathes with large shovels, place them in iron barrows, and to wheel away and dump the contents outside the shop. Their average figure was 184 calories. The nearest military parallel would be that of entrenching—intermittent navvy work, probably more intermittent, but, while it lasted, more strenuous than that of the women. Here the average output, 187 calories, is very close to that of Greenwood, Hodson, and Tebb. The result of Cathcart and Orr's work was to suggest that the average recruit, if not underfed, was dangerously near the limit, but, records of successive weighings not confirming the inference, the authors surmise that the use of the old British Association standards of height and weight was improper. A sample of weights of recruits led them to reduce the hypothetical mean surface from 1.77 square metres to 1.70. Upon this basis the ration issue was defective to the extent of 372 calories in the case of adults, and gave a positive balance of 116 for the boys. "In practice this would mean that when the values of the food purchased locally by the soldier *plus* the supplies from home are taken into consideration, along with a slight reduction in the energy output for the reasons already stated, the adult recruit's intake and output of energy probably just balance, and the young recruit would obtain a sufficient surplus to permit of the increase in weight found."

In the results actually achieved, and still more in the suggestions it conveys for future work, this report on the energy output of recruits in training is worthy of high commendation. We should like to be able to add that upon these foundations much more is likely to be built; but, we fear, few events are less likely. Except for the enthusiasm of a few individual workers, such as Professor Waller, this matter will attract little attention unless and until the nation is again menaced by starvation.

[1] His Majesty's Stationery Office, pp. 70, 3s. net.

STRAINS OF THE SYPHILITIC VIRUS.

THE doctrine that general paralysis is due to syphilis, which had been gaining ground during the later years of the last century, is now generally accepted. The percentage of cases of general paralysis in which a history of syphilis was obtained increased as the

[2] *Proc. Roy. Soc.*, B, xci. 1919, p. 62.

inquiries on this head were more carefully made. In the earlier part of the nineteenth century the percentage was thought to be 2 or less. By 1880 it had risen to 15 or 30, and in 1900 to 60 or 80. Fournier, who in 1879 asserted that general paralysis was due to syphilis, founded this belief on what he had observed in a series of individuals he had been able to watch for years after infection. The matter was clinched when, in 1913, Noguchi demonstrated the treponema in the brain of general paralytics. Levaditi and Marie, who were among the first to confirm Noguchi's observations, have now published an essay[1] in which they review the clinical facts and set out in consecutive manner the experimental evidence they had previously published in support of the hypothesis that general paralysis is produced by a particular strain of the treponema.

Fournier, in the course of the inquiry already mentioned, had come to the conclusion that general paralysis followed an attack of syphilis the early manifestations of which were mild. To this rule there were hardly any exceptions. Among the 243 syphilitics in whom the primary manifestations were serious and long-lasting not one eventually developed general paralysis or locomotor ataxy. On the other hand, in 83 patients who all eventually became general paralytics the early manifestations were mild, and secondaries sometimes wholly absent. This observation of Fournier's was well known thirty or forty years ago, and the fact that the initial symptoms in patients who afterwards developed general paralysis were mild was accounted for on the supposition that, owing to this mildness, treatment was inadequate or neglected. This explanation, never satisfactory, has been proved to be incompatible with the clinical facts and histories. Among other things direct evidence was obtained that in certain series of cases of general paralysis syphilis had been contracted from the same source. The lesions of general paralysis and locomotor ataxy differ in their histology from those ordinarily produced by syphilis, and even before the discovery of the *Treponema pallidum* Erb, Nonne, and Mott had been impelled to come to the same conclusion as Marie—that is to say, they accepted the hypothesis that in general paralysis and locomotor ataxy the virus was of a particular kind attacking the nervous centre and therefore properly described as neurotropic, that of ordinary syphilis, which attacks in particular the cutaneous structures, being termed dermotropic.

Inoculation experiments in the rabbit showed that in general paralysis the treponema might be present in the blood and in cerebro-spinal fluid as well as in the cerebral substance. Certain differences were observed in the local lesion produced by inoculation with this neurotropic virus when compared with the dermotropic virus of ordinary syphilis. Marie and Levaditi set them out at length. It may suffice to say that the incubation period was longer on the first transmission from man to rabbit, and that, though it shortened with each passage from rabbit to rabbit, it remained much longer than for the dermotropic strain when similarly transmitted. The local lesion was slighter and more superficial, being a papulo-squamous erosion which quickly healed, apparently without scar. Finally, rabbits, after recovering from the results of inoculation with the neurotropic strain, were not again susceptible to that strain, but were susceptible to the dermotropic strain. The converse held with this latter strain, the animal inoculated with it remaining susceptible to the other.

The authors admit that they have not proved conclusively that the treponema with which the patient who eventually becomes a general paralytic or tabetic was infected is always of the neurotropic strain at the time the syphilis is contracted. There is as yet no evidence that in man the local lesion is different. It is possible that in some persons the central nervous system is peculiarly susceptible, and that the dermotropic treponema is in them transformed into the neurotropic. Marie and Levaditi, however, reach the conclusion that the nervous sequelae of syphilis are due to infection from a special source by a strain of treponeme with a more or less marked neurotropic aptitude; this strain can easily adapt itself to the cerebro-spinal centres, and possibly may eventually be transformed into a variety with fixed characters which would justify its being called exclusively neurotropic.

[1] A. Marie et C. Levaditi: La paralysis générale est due à un tréponème distinct de celui de la syphilis banale, *Rev. de Méd.*, 1920, No. 4, p. 193.

THE EFFECTS OF INBREEDING AND CONSANGUINEOUS MARRIAGES.

The popular impression, that inbreeding in animals and consanguineous marriages in man are bad for the race, probably depends to some extent on the opinion expressed in 1878 by Charles Darwin that "the consequences of close interbreeding carried on for too long a time are, as is generally believed, loss of size, constitutional vigour and fertility, sometimes accompanied by a tendency to malformation." The matter, indeed, was regarded as so definitely settled that no experimental work was done for many years, and it is only within the last decade and a half that the problem has been again attacked. Among the researches bearing on this question, that carried on for more than nine years by Dr. Helen Dean King,[1] Assistant Professor of Embryology at the Wistar Institute of Anatomy and Biology, Philadelphia, deserves special attention on account of the minute care and attention to detail displayed, especially as regards hygienic and dietetic conditions. Albino rats were employed, and the experiments began in 1909 with two females that were mated twice with a brother from the same litter, and then twice with an unrelated male stock; for twenty-eight generations this programme was continued, all the females used being from inbred litters. In the earlier generations the inbred rats showed all the defects popularly supposed to appear in any closely inbred stock; thus many females were sterile, the litters were small, many of the rats were dwarfed and short-lived, and malformations, especially of the teeth, were common. If the experiments had been stopped at this point the results would have confirmed the conclusion reached by Darwin and others, that inbreeding invariably leads to sterility and physical degeneration. Fortunately, however, many rats in the general stock colony, in which there was no inbreeding, showed the same features, and it was found that the diet was at fault. After correcting the adverse factor in 1911 all the characteristics said to be typical of the dire effects of inbreeding were banished, and have never reappeared. These results confirm the conclusion of Gentry on swine and of various stock-breeders on horses and cattle (Chapeaurouge, Anderson) that there is not any general physiological law forbidding inbreeding, and that the results obtained depend largely on the character of the stock that is inbred.

A paper just published, "On the physical effects of consanguineous marriages in the royal families of

[1] *Studies in Inbreeding.* Reprinted from the May, July, October, 1918, and August, 1919, issues of the *Journal of Experimental Zoology.*

ancient Egypt," by the late Sir Marc Armand Ruffer,[2] and intended to form part of a volume of *Studies in Palaeopathology*, entirely confirms the experimental results just mentioned. Although the legislation of most modern nations shows evidence of the conviction that the offspring of consanguineous marriages are prone to all manner of evils, this appears to be a comparatively recent idea; for mention of such marriages is not uncommon in early Hebrew records, as is shown by reference to the Bible; and marriage between brother and sister was fashionable from very early times in Egypt, where, throne and property being inherited through the woman, mother or wife, as legal head of the house, it was very doubtful if "a king could reign except as the husband of the heiress of the kingdom" (Petrie). As the king was the ruler, whereas the queen, though the heiress to the throne, had no executive power, the only way to keep the regal power in the family was for the nearest male descendant of a king to marry the heiress, who was very often his sister. As such marriages were common, evil effects would not have escaped the notice of satirists, and yet there is no such reference in Egyptian literature. The records of the royal families of the eighteenth and nineteenth dynasties, and of the Ptolemies (direct and indirect lines), in which the physical and mental characters of the individuals are available, have been analysed with a wealth of interesting historical detail by Sir Marc Ruffer, and do not show that the repeated consanguineous marriages exerted any unfavourable influence on the physical characteristics or mental powers of the royal families. In fact, from the history of the Ptolemies there is no evidence that their predisposition to obesity or to gout was increased by their consanguineous marriages.

ANIMAL EXPERIMENTS IN 1919.

THE customary return has been made by the Home Office showing the number and nature of experiments on living animals during 1919 under licences granted under the Act 39 and 40 Vict., c. 77. The report for England and Scotland is signed by Sir G. D. Thane, the chief inspector. The total number of licensees was 714, but of these 352 performed no experiments. Tables are given showing the names of all registered places, the names of those who held licences, and the number of experiments returned by each. Of the 362 licensees who performed experiments, it is specified whether these experiments were done under the licence alone or under any special certificates. Those performed without anaesthesia are distinguished from those in which anaesthetics were used. Experiments with anaesthetics numbered 4,459. Inoculations, hypodermic injections, and some few other proceedings performed without anaesthetics, included 58,418 experiments. In no case was a certificate dispensing entirely with the use of an anaesthetic allowed for an operative proceeding more severe than subcutaneous venesection; serious operations are always required to be done under an anaesthetic. The total number of experiments was 62,877, being 14,733 less than in the previous year. The report shows how strict are the regulations which must be complied with in performing experiments on living animals; it wholly refutes a great part of the allegations made by the antivivisection organizations. A large number of experiments—for the most part simple inoculations and similar proceedings—were performed either on behalf of official bodies, with a view to the preservation of the public health, or directly for the diagnosis and treatment of disease. During the year a large number of experiments were witnessed by the inspectors, their visits usually being made without previous notice. "We have found the animals suitably lodged and well cared for and the licensees generally attentive to the requirements of the Act and the conditions attached to their licences by the Secretary of State." Three irregularities were reported, two of them technical in nature. In the third case an applicant for a licence began forthwith a series of feeding experiments intended to bring about a condition of disease undoubtedly calculated to give pain within the meaning of the Act. In view of this disregard for the provisions of the Act the applicant was told that the Secretary of State did not feel justified at the time in granting him a licence. The inspecting staff now consists of the chief inspector and two full-time inspectors, who between them cover the 206 places registered for animal experiments in England, Scotland, and Wales. Of these places a considerable number, however, were temporary war institutions whose registration was cancelled before the end of 1919. The report for Ireland is signed by Dr. M. C. McKenna, who states: "I have every reason to believe that the holders of licences have obeyed the spirit as well as the letter of the Act, and that experiments have not been unnecessarily multiplied." The number of licensees was 27, of whom 10 performed no experiments. During the year 449 experiments were performed, of which 340 were simple inoculations under Certificate A. It must be borne in mind that operative procedures and experiments performed under Certificate A, without anaesthesia, are only such as are attended by no considerable, if appreciable, pain. The certificate is, in fact, not required to cover these proceedings, but to allow of the subsequent course of the experiment during the time needed for the development of the results of administering a drug or injection. It is wrong to assume that the animal is in pain during the whole or, indeed, any part of this time. "In cases of prolonged action of an injected substance," writes Sir G. D. Thane, "even when ending fatally, the animal is generally apparently well, and takes its food as usual, until a short time before death. The state of illness may last only a very few hours, and in some cases is not observed at all." In a very large number of inoculations the results are, of course, negative, and the animals suffer no inconvenience whatever; such experiments are therefore entirely painless.

HEART SURGERY.

SIR CHARLES BALLANCE'S Bradshaw Lecture on the Surgery of the Heart[1] in its published form gives twelve illustrations of specimens in the War Museum. Those specimens are significant of the one new factor introduced by the last six years' experience—namely, the large number of surgeons who have operated upon the heart, some of them a good many times; and the still greater number who are almost as familiar with the inside of the thorax as with the peritoneal cavity. At any "abdomen and chest" centre near the front a young surgeon soon became familiar with wounds of the diaphragm; learnt to open the chest and manipulate the lung freely; and, more important still, was rid of the idea that special anaesthetic apparatus was essential. True, the patients, though severely wounded, were young healthy men, for the most part picked lives; but then even "peace" surgery of the heart has hitherto been almost entirely confined to wounds, and those generally in young adults. The question of access has always exercised the minds of writers upon the subject, and Sir Charles Ballance is content to describe the three usual routes, recognizing that the actual choice is generally determined by circumstances special to each case. Similarly with the question of "drainage"—upon which in the past very decided views

[2] *Proc. Roy. Soc. Med.*, 1919, xii (Historical Section), 145-190 (issued August, 1920).

[1] The Bradshaw Lecture on the Surgery of the Heart. By Sir Charles A. Ballance, K.C.M.G., C.B., M.V.O., M.S., F.R.C.S. (8vo, pp. 154; illustrated. Macmillan. 1920. 10s. 6d. net.)

have been expressed, both for and against—the old rule of general principles has proved correct. It is wise to do without drainage in suitable cases. Sir Charles Ballance has contributed an observation of importance in this matter of drainage, especially in cases of established pyopericardium. He has shown that pus in the recess of Haller cannot be drained except by an opening in the left lateral aspect of the pericardial sac, and his book should be carefully studied for an elucidation of the anatomical reasons. It is an interesting speculation as to what the immediate future will bring forth in this field. There have not been wanting suggestions from physicians for surgical intervention in such conditions as mitral stenosis; neither is there any lack of successful animal experiments in the same direction. Given at the moment a large number of surgeons who have operated on the heart for injury, may we not look for effective realization of the physician's dreams?

WELFARE OF THE BLIND.

THE proposals which the Advisory Committee on the Welfare of the Blind made to the Ministry of Health last year were accepted by the Government, and in the report of this year[1] we find the first account of the working of these proposals. It was desired that provision should be made for the better education, training, employment, and maintenance of the blind. For these services grants have been authorized for workshops, home workers, blind homes, hostels, home teachers, and for book production. County associations receive a grant towards their costs according to the number of registered blind in their area. Attached to the giving of these grants were conditions as to the suitability of the workshop or other arrangement; and it is now reported that there has resulted much needed reform in the sanitary conditions of a number of workshops and homes, and an increase of the interest shown by those responsible for these institutions; in the words of the report, "A fresh impulse has been given to all work on behalf of the blind." The system of grants has resulted also in the co-ordination of a number of agencies and workshops for the blind to their advantage. A few established agencies, both in the provinces and London, have held aloof so far, even to the extent of abstaining from making any application for a grant from the Ministry; the Committee hopes they may see their way to reconsider their decision. Comment is made on the satisfactory arrangement for co-operation with the Ministry made by the National Institute for the Blind, an institution which holds a commanding position in the blind world. But 46 per cent. of the blind are, for one reason or another, unemployable, and this class of the blind is the crux of the whole problem. The grants of money to workshops has benefited these by releasing money subscribed by the charitable for the assistance of these helpless ones. Further, the report draws attention to the proposals (now law) whereby the old age pension should be available for a blind person at the age of 50 years. At that age a blind person who has not previously been trained in blind work is hopelessly at a disadvantage, and a definite provision for meeting this incapacity is an undoubted necessity. The report contains a number of valuable statistical schedules on the present location and employment of blind persons.

THE BISHOPS' DILEMMA.

IT is curious to find the Christian Church on its defence against three such aberrations of the intellect as Spiritualism, Christian Science, and Theosophy. In the Middle Ages each of these heresies would have been anathematized with bell, book, and candle. Now they are considered fit subjects for serious discussion at the Conference of Bishops of the Anglican Communion, drawn from all parts of the world to the number of 250, which met in Lambeth this summer. The adherents of these faiths are treated gently as erring sheep; so that in the Encyclical letter which prefaces the resolutions and reports of the conference it is stated that even if "adherents of these movements are drawn into practices and cults which injure their spiritual life and endanger their loyalty to Christ," yet, "it must not be forgotten that these movements are very largely symptoms and results of reaction against materialistic views of life." This reaction has been strengthened as a result of the war. "The bereaved heart of mankind, with earnest, if not always wise, endeavour, is straining to bridge the space that lies between earth and heaven." The bishops consider that Church people do not take enough account of the recent growth of knowledge about the power of spirit and mind over body. Some schools of thought within the Church are, they say, liable to fall into a narrow dogmatism, forgetful of the needs of such souls as are deeply conscious of the mystery into which all known truths shade off; the three movements make their appeal to professed members of the Church unsatisfied by the normal teaching and discipline offered to them. The special committee appointed by the bishops to consider the three heresies soon found the inquiry elusive. The literature, they state, is voluminous; but it was not easy to find authoritative statements to enable them to define precisely the marks which distinguish the teaching and practice to be accepted by adherents. They find in the literature the statement that Theosophy is a body of truths, but that members are not bound to accept any particular statement of them. Christian Science uses the terms "reality," "error," "material" and "spiritual," but the bishops' committee finds it difficult to be sure that it appreciates the meaning attached to them. The committee, however, gives five characteristics common to all three subjects. First, they are protests against materialism and a materialistic basis of human life. Secondly, they draw much of their strength from a new knowledge of the extent of psychic powers with which human nature is endowed. Thirdly, they claim to supply something which the teaching and practice of the Church fail to give. Fourthly, they contain nothing essentially new, many of the doctrines being a revival, sometimes couched in the same terms, of Gnosticism and Neo-Platonism; hardly one of them finds its centre in the central revelation of the Christian faith—the incarnation of our Lord. It is not necessary here to go into the examination of the three heresies, but from the investigation of spiritualism the bishops state that the researches of the Psychical Research Society and others lead them to understand that certain conclusions have been reached. They summarize the conclusions as follows: (1) There is a conviction of the reality of telepathy. (2) There is a conviction of the reality of a subconsciousness. (3) This does not necessarily imply communication with beings no longer limited by the conditions of bodily existence, though there are phenomena which appear to support the hypothesis. (4) In investigating phenomena that seem to indicate such communication great difficulties arise, owing to the play of the subconscious self in the medium employed and in the inquirer. The bishops wisely give a serious warning against unregulated exercise of an element of human consciousness which acts independently of the reason and the will, and against allowing reason and will to abdicate in its favour. The medical man and the scientist, having possibly some doubt about the validity of some of the conclusions that have been stated, will support emphatically this warning. As regards that spurious worship of the goddess Hygeia called (on a duplicated *lucus a non lucendo* principle) Christian Science, we confess to a preference for Christian teaching combined with common sense. And

[1] The Second Annual Report of the Advisory Committee on the Welfare of the Blind to the Ministry of Health, 1919-1920. Published by H.M. Stationery Office; pp. 31. Price 6d. net.

the Oriental mystic who likes a body of truths which nobody, even though a member of the society, need accept, may be left to enjoy Theosophy.

SCIENTIFIC AND INDUSTRIAL RESEARCH.

THE fifth annual report of the Committee of the Privy Council for Scientific and Industrial Research[1] deals with the period from August 1st, 1919, to July 31st, 1920. Mr. Balfour, the Lord President, records that the work of the department has grown more rapidly than could be foreseen a year ago. Co-ordinating boards have been set up to organize all the scientific work which is of common interest to the fighting forces of the Crown. These boards include technical representatives of each of the fighting services and of civilian departments materially interested in their work, as well as independent men of science. Again, a Building (Materials and Construction) Research Board has been formed at the request of the Ministry of Health and is preparing a comprehensive scheme of work. Steady progress is reported by both the Fuel Research and the Food Investigation Boards; in connexion with the latter the department, in co-operation with the university, has undertaken to erect at Cambridge an institute for biochemical and biophysical research at low temperatures. The report of the Advisory Committee is signed by the administrative chairman, Sir William McCormick, who takes this occasion to review what has been achieved during the past five years—"the formative period of our existence." The Advisory Council and the department which has grown up round it were not created as part of the machinery for war; they contributed to the common need, but they were brought into being to remedy deep-seated shortcomings revealed by the war, and the full effect of their activities could not be looked for until after peace had come. The programme has gradually been defined, so that it now falls under four main heads: (1) The encouragement of the individual research worker, particularly in pure science; (2) the organization of national industries into co-operative research associations; (3) the direction and co-ordination of research for national purposes; and (4) the aiding of suitable researches undertaken by scientific and professional societies and organizations. What has already been done in each of these spheres is briefly reviewed in the report. In making grants to individual research workers the department is guided not so much by the themes they propose to pursue as by the evidence obtainable as to their scientific capacity, the aim being to assist promising workers as well as promising lines of inquiry. This seems to us the right line to take. It is worthy of note that the grants made to individual workers have grown from approximately £3,200 in 1916–17 to £26,700 in 1919–20, while for the ensuing academic year provision has been made for grants to individual research workers and students in training to the amount of £45,000. Much of the report is, of course, taken up with matters lying outside the sphere of medicine. The reports of the Mine Rescue Apparatus Research Committee were referred to in our issue of August 21st, p. 283; the work of this committee will probably come to an end at the close of the present year. The Oxygen Committee has had a medical uses subcommittee with an oxygen workshop laboratory and liquid air plant at Edinburgh, but henceforward the purely medical side of oxygen research will be dealt with by the clinical subcommittee of the Medical Research Council. Another committee, that dealing with gas cylinders, has undertaken to design and test an oxygen cylinder that could be satisfactorily handled in sick wards or hospitals. The Anti-glare Glass Research Committee is studying the suitability of different types of coloured and neutral tinted glasses for use by troops in tropical countries, by airmen, and by the navy. During the past year the financial and scientific control of the Industrial Fatigue Research Board has passed to the Medical Research Council.

[1] Published by H.M. Stationery Office. Copies may be obtained (price 1s.) through a bookseller, or at any of the Stationery Office's addresses in London, Manchester, Cardiff, Edinburgh, and Dublin.

THE TEACHING OF PHYSIOLOGY.

IN Dr. Thomas Lewis's address[1] delivered at Cardiff to the Physiological Section of the British Association the relation of physiology to medicine was considered from the standpoint of the physician. In the discussion which followed, Professor P. T. Herring, Chandos Professor of Physiology in the University of St. Andrews, discussed the problem from the point of view of the teacher of physiology. He expressed sympathy with Dr. Lewis's plea that the teaching of physiology to medical students should be directed to helping them, as far as possible, when they were doing clinical work in the later years of the curriculum. Physiology, Dr. Herring remarked, is now so wide a subject that the time has come when physiologists must make some selection as to what portions of the subject should be taught to the medical student. Students taking science courses have two years for study, and to them it is possible to attempt a more complete exposition of the subject. For the medical student, however, the study of physiology is confined to the second year. In that period he has to be taught the very rudiments of experimental work—to be shown how to use his hands with simple instruments, how to make records of vital phenomena; above all, he has to be taught to cultivate the faculty of critical observation. In selecting a course of physiology for medical students there is a readily comprehensible difficulty in giving proper weight to the parts which are deemed to be of the greatest medical importance; every part of the subject has some bearing on medical problems, and probably no two teachers would agree as to what should be included and what omitted. The existence of great scope for variety in the treatment of the subject is far from being an evil; the chief disadvantage to the student lies in the examination system, which demands the taking of the degree or diploma of one or other of the examining bodies, whose requirements are not uniform. There is much to be said for the instruction of the medical student, during his final years of study, in physiological subjects of particular medical interest, especially when it happens that recent work has added to the knowledge of those subjects. At this stage of his training the student is in a better position than in his second year for the appreciation of the significance of physiological science. In this stage of his career, too, access to human subjects in whom physiology may be studied is easier than in earlier years (although the foundation of institutes of clinical research, such as that of Sir James Mackenzie at St. Andrews, may help in the earlier provision of material for physiological study). Apart from administrative difficulties, the chief impediment to such later teaching is that the time-table of the medical student is already overloaded, and that another year of study would probably be required. To many teachers, Dr. Herring remarked, instruction in practical physiology in its experimental aspects was unsatisfactory; it must be remembered, however, with regard to the clinical instruction of the medical student (during his second year of study) in physiological science, that at this period the student was in most cases unable properly to appreciate the significance of even a smattering of instruction in ordinary clinical methods. At this stage the very rudiments of experimental work had to be imparted; how far the student at this time could appreciate such instruction as was suggested by Dr. Lewis seemed doubtful.

[1] BRITISH MEDICAL JOURNAL, September 25th, 1920, p. 459.

THE WHITE MAN IN NORTH QUEENSLAND.

The report for 1919 of the Australian Institute of Tropical Medicine, Townsville, Queensland, contains accounts of researches conducted by Dr. A. Breinl, Dr. W. J. Young, and Mr. G. Hill. The conclusion has been reached that qualitative, but not quantitative, physiological changes are found, in correspondence with the tropical climate, among the white inhabitants of North Queensland. During the hot season the quantity of urine is decreased and that of the sweat increased; diminished secretion of sodium chloride in the urine is compensated by its increased elimination in the sweat. After exercise the body temperature is found to rise more quickly, and subsequently to decrease more slowly than in a temperate climate. In accordance with a decrease in the amount of protein metabolized there is a diminution of total urinary nitrogen. The alveolar air in resting inhabitants of tropical Queensland shows a lower carbon dioxide content than the European average. In view of the statement made by De Hangen and Schut of Java, that the blood-sugar content of white men living in tropical is greater than that of those living in temperate climates, a research into the composition of the blood in North Queensland has been commenced. In nine cases examined by the colorimetric method of Lewis and Benedict, the blood-sugar ranged from 0.099 to 0.126 gram per hundred cubic centimetres, and the average was considerably higher than that reported by Gettler and Baker in America. In the blood of eleven persons examined by Maclean's method, the average figure was 0.102 gram. These examinations were made at noon; it was found, however, that the figures varied considerably according to the time which had elapsed since the last meal.

THE EXISTENCE OF THE FORAMEN OF MAGENDIE.

The perforation in the roof of the fourth ventricle, described a century ago by Magendie, and the lateral orifices in the same structure, known variously as the foramina of Retzius, Key, or Luschka, though described in practically all textbooks of anatomy, have not always been recognized by anatomists as existing in the living subject. The existence of the median opening, Magendie's foramen, was denied by Kölliker, Cruveilhier, and others. Cannieu has been the only observer to doubt the presence of the foramina of Retzius. The critics maintained that these holes were artificially produced during dissection. Injection experiments, substantiating their existence, cannot be altogether accepted, for the roof of the fourth ventricle is so extremely fragile that if coloured fluids injected are found to pass from the spinal theca to the ventricles, one cannot be certain that a rupture of the velum was not produced, especially in the cadaver. Coupin[1] has studied the question in small mammals such as mice, rats, guinea-pigs, young cats, and young rabbits. He states that in the case of rabbits, if the region of the bulb is examined immediately after death, without making any traction on the bulb or the cerebellum, the covering of the fourth ventricle appears to be perfectly continuous, but that if the examination is made several hours after death and traction is put on the cerebellum, a hole comparable to the foramen of Magendie is often produced. As the result of examining serial sections of the brains of the animals mentioned, he says that the foramina of Magendie and of Retzius can be shown not to exist. He fixed his specimens and subsequently decalcified the bony encasement in order to obviate *post-mortem* changes and to protect the finer structures from injury. Under such conditions the sections showed that there was no interruption of the covering either in the middle line or laterally. So far as these observations go, and they ought to be repeated, they indicate that in the smaller mammals, at any rate, there is no direct communication between the ventricular cavity and the subarachnoid spaces.

[1] *C. R. Soc. Biologie*, vol. lxxxiii. No. 22. 1920.

MEDICAL SOCIETY OF LONDON.

The programme for the first half of the 148th session, 1920–21, of the Medical Society of London has just been published. The annual general meeting will be held on October 11th, at 8 p.m., and Sir William Hale-White will deliver his presidential address on "Then and Now," at 8.30 p.m. On October 25th a discussion on the determination of degree of renal function will be introduced by Professor J. B. Leathes; and on December 6th Sir Berkeley Moynihan will introduce a discussion on the surgical treatment of malignant disease of the colon. On November 8th there will be a clinical meeting, and November 22nd will be devoted to cardiological matters. The Lettsomian Lectures will be given in February and March, 1921 by Mr. George E. Gask, and the annual oration will be delivered in May by Lord Dawson of Penn.

Sir Robert Philip of Edinburgh, Lieut.-Colonel Nathan Raw, M.P., and Dr. David Lawson of Banchory, have been appointed as delegates of the British Medical Association to attend the Conference of the National Association for the Prevention of Tuberculosis, to be held at Liverpool on October 7th and following days.

It is announced by the Medical Women's Federation that Miss Sophia Jevons, M.B., has decided to stand as an independent candidate for the University of London at the next parliamentary election. Dr. Jevons is a co-opted member of the London County Council Education Committee, and has had considerable experience in social work.

The Ministry of Health has set up a Departmental Committee on the Causes and Prevention of Blindness, with the following as its members: The Right Hon. G. H. Roberts, M.P., Mr. J. C. Bridge, F.R.C.S., Dr. A. Eichholz, C.B.E., Mr. N. Bishop Harman, F.R.C.S., Mr. J. B. Lawford, F.R.C.S., Mr. E. D. Macgregor, Mr. G. F. Mowatt, Mr. J. S. Nicholson, Mr. J. H. Parsons, C.B.E., F.R.C.S., Mrs. Wilton Phipps, Mr. W. M. Stone, Dr. James Taylor, and Mr. Stephen Walsh, M.P. The terms of reference of the Committee are to investigate and report on the causes of blindness, including defective vision sufficient to impair economic efficiency, and to suggest measures which might be taken for the prevention of blindness. The Ministry has appointed Mr. G. H. Roberts to be chairman, and Dr. R. A. Farrar and Mr. P. N. R. Butcher joint secretaries. We understand that the first meeting will be held next week.

As a memorial to the late Major-General William C. Gorgas it is proposed to establish in Panama an international institute for research in tropical diseases.

The Draft Regulations of March 11th, 1920, having been published for the required period, the Board of Education has confirmed, without important amendment, the consolidated Regulations relating to special services of elementary education (other than nursery schools) for promoting the healthy physical and mental development of children. Attention is directed to the opinion expressed in the explanatory Memorandum, that remedial schemes conducted on a large scale for open-air schools, including camp schools, should be recognized under the Special Schools Regulations.

The Home Service Ambulance Committee of the British Red Cross Society and the Order of St. John in England has issued a handbook showing the addresses of ambulance stations and of the officers in charge in England and Wales and Ireland. The service, it will be remembered, was established on the release of the joint committee's ambulances from war work, and the aim of the committee is to distribute ambulances on such a scale that whenever an illness or accident occurs there shall be a motor ambulance within a convenient distance. The service is arranged on a county basis, and is under the supervision of the director in each county. In London applications for ambulances should be made to the Secretary of the Home Service Ambulance Committee, 19, Berkeley Street, W.1.

THE MUNICIPALIZATION OF HOSPITALS.

THE BRADFORD EXPERIMENT.

BY

CHARLES BUTTAR, M.D.

I.

IT may not be widely known that Bradford now possesses a municipal hospital. While academic discussion has been taking place on the Dawson report and the future of health services, the City Fathers of Bradford have been engaged in instituting a health centre of their own A visit to the city has led to the conviction that a study by the medical profession of the methods by which this institution has been brought into existence, and of the proposals for its management in the future, is of the utmost importance. Already, it is believed, other industrial towns are watching developments with interest, and if success is achieved at Bradford, there can be no doubt that there will be a large extension of what is in some ways a revolution in hospital organization and management in this country.

Bradford is a city of some 300,000 inhabitants, engaged chiefly in the wool trade. It is only twelve miles from Leeds, and for a long time there were no medical men in the city who confined themselves to purely consulting and specialist work. The institutional treatment was provided by the Royal Infirmary, the Children's Hospital, the Eye and Ear Hospital, and a Poor Law infirmary. More than ten years ago it was recognized that the buildings of the Royal Infirmary were out of date, and provided insufficient accommodation. Accordingly another site for the infirmary was acquired, and plans were got out for a new building. But the £200,000 then thought necessary was never collected; the war, though adding much to the wealth of Bradford, interfered with the proposals for building, and the site remains as it was ten years ago.

In the meantime Bradford, which has always prided itself on its municipal efforts, has become more socialistic; it now has a city council in which there is a majority of Labour representatives. Every new State proposal for health services has been anticipated or adopted by the council, until at the present time there are said to be twenty-seven full-time medical officers engaged in municipal health work. After the war the City Council was seized with a desire to crown its health activities by possessing a hospital of its own, and on April 1st of this year it entered into an arrangement with the Poor Law guardians by which the old Poor Law infirmary, which had been used as a war hospital, should be leased to the council for five years. Under this agreement the council takes over the care of all Poor Law patients, except the aged and imbecile, who had been housed elsewhere during the war; the guardians retain the right to visit the hospital, and the cost of maintenance is divided between the council and the guardians according to the number of days beds are occupied by the patients of the respective bodies. The superintendent of the Poor Law infirmary becomes a whole-time officer of the municipal hospital under the M.O.H. This arrangement appears to have been provisionally approved by the Minister of Health, but the details of the scheme are to be submitted for his approval this month. It appears probable also that Clause 11 of the Ministry of Health (Miscellaneous Provisions) Bill—a bill which ranges from houses to clinical thermometers—is designed to legitimize such projects as the Bradford Municipal Hospital.

The City Council proposes that its new hospital shall be completely up to date, with a first-class staff and first-class equipment, and shall provide the best possible treatment. But it does not appear that in designing the scheme the council has taken into consideration the existence of the Royal Infirmary and of the other voluntary hospitals, nor has any communication been addressed to the medical profession of Bradford. It is curious that a council of representatives largely drawn from the Labour party, which protests so strongly against "secret diplomacy," should elaborate its schemes with so little contact with the outside world. From what has been said about the Royal Infirmary it is plain that the new municipal hospital will be a serious rival to the old voluntary hospitals; and one of the aldermen boldly asserted that voluntaryism is absolutely dead in Bradford. Recently the City Council held a meeting to consider proposals made by one of its committees with regard to a war memorial for Bradford. One proposition was that the war memorial should take the form of a new general hospital. Though the matter of the memorial was ultimately referred back to the committee, the Labour members succeeded by a small majority in defeating the proposal for such a hospital. In the course of the debate the following expression was used: "If they were to have a new hospital let it be provided out of the rates, so that every man could regard it as his right and not as a charity." While active hostility to the Royal Infirmary was kept in the background, it was plain that the Labour members did not intend to tolerate any rival to the scheme they have in hand.

It seems clear that for a long time past a contest has been going on in Bradford between the voluntary system and the system of municipal control and support. On the voluntary side attempts have been made to unite the three voluntary hospitals, and to collect subscriptions for the building of a large new hospital on the site acquired by the Royal Infirmary and to make this hospital the war memorial for Bradford. These attempts have failed, and the apparent approach of a period of bad trade in Bradford has made the failure more complete. In the meantime the Labour members on the City Council seem desirous of giving the *coup de grâce* to the voluntary system, and by their refusal to adopt the proposal of a new general hospital as a suitable war memorial will leave the way open to the full development of their municipal hospital. Finally, the Royal Infirmary is handicapped by the fact that there is no university at Bradford such as exists at Leeds; and the lack of the prestige attaching to the medical school of a university increases the difficulty of those who desire to retain voluntary hospitals in the city of Bradford.

In the next article it is proposed to deal with the details of the municipal hospital scheme, and to show the effect that they will have on the consultants, the general practitioners, and the community.

(To be concluded.)

Ireland.

IRISH PUBLIC HEALTH COUNCIL.

Withdrawal of State Grants for Irish Health Services.

THE Irish daily press contains reports of a meeting of the Irish Public Health Council held on September 21st, at the offices of the Minister of Health for Ireland, when Dr. E. Coey Bigger was in the chair, and the members present were Sir John W. Moore, Sir Joseph A. Glynn, Dr. Maguire, Dr. Alice Barry, Mr. E. Bourke, C.B., Rev. P. Kerlin, C.C., Mrs. McMordie, Mr. E. F. Stephenson and Mr. J. E. Johnston, M.B.E. The Council went carefully into the question of the stoppage of grants for the health services in Ireland, and, it appears, was unanimously of opinion that all grants for such services should be made available without any conditions being imposed of a political character. In the afternoon the Council waited on the Chief Secretary, who is also the Minister of Health for Ireland, and having discussed several urgent health problems relating to Ireland, placed before him the serious consequences to the health of the community that would be entailed if the Government grants for health services in this country were withheld. The Chief Secretary was also reminded that a considerable portion of the salaries of Irish Poor Law medical officers was paid out of these grants, and that it would be penalizing these already underpaid officers if the grants from public funds were stopped as the result of making their payment contingent on boards of guardians and district councils giving certain undertakings of a political nature. The Council also laid particular stress on the necessity for continuing the grants for child welfare, tuberculosis, and other special diseases. The Chief Secretary, having discussed the question fully in all its bearings, promised that the Council's recommendations would be carefully considered by the Government.

Grants for Voluntary Hospitals.

The Council had under consideration the question of voluntary hospitals in the larger cities in Ireland. It being

understood that the Committee of the National Relief Fund contemplates allocating a sum of £700,000 for voluntary hospitals in the United Kingdom, the Council decided to urge the Irish Government to press for a substantial share for Ireland, and to recommend that the question of the allocation of such share amongst the various institutions in the country should be most carefully considered, having regard to the circumstances of each hospital. The Chairman reported that he had secured from the Medical Research Council 412 mg. of radium bromide (value £8,000 to £10,000) for the purpose of medical research and the treatment of disease. A committee was appointed to regulate the conditions under which the radium should best be made available.

Scotland.

Scottish Temperance Act.

The Scottish Temperance Act, passed in 1913, came into force last June, and by posters, handbills, meetings, and letters and articles in the daily press a spirited controversy is going on. Under the Act one-tenth of the number of local government electors in the areas, numbering about a thousand, into which Scotland is divided may demand a poll in the manner prescribed by the Act. These requisitions for a poll must be lodged before the end of September. The poll must take place in November or December; in the majority of areas the date will probably be November 2nd, the day on which the municipal elections take place. The elector may vote for (1) a no-change resolution, leaving things as they are; (2) for a limiting resolution, which would have the effect of reducing the number of certificates for the sale of excisable liquors by one-quarter; or (3) a no-licence resolution, which would have the effect of allowing certificates for the sale of excisable liquors to be granted only to inns, hotels, or restaurants, at the discretion of the licensing authority. A no-licence resolution will be deemed carried if 55 per cent. of the votes recorded are in favour of it and not less than 35 per cent. of the electors on the register for the area have voted in favour of it. If a majority of the votes recorded in favour of a limiting resolution and not less than 35 per cent. of the electors vote in favour of it, the resolution will be carried; but the Act contains a further unusual proviso—this is, that if a no-licence resolution be not carried, the votes recorded in favour of it will be added to those recorded in favour of the limiting resolution. Should a no-licence resolution be carried, a licence may, as has been said, be granted to a restaurant or hotel, and the certificate will require that there shall be on the premises no drinking bars, and that liquor shall be sold only to persons lodging or residing in the house or taking a meal in the restaurant.

Correspondence.

THE WAR PHYSICAL CENSUS.

Sir,—Will you permit me to refer to Dr. H. B. Brackenbury's letter in the Journal of September 18th, and to thank him for his appreciative remarks concerning my lecture at Aylesbury?

The time at our disposal did allow of some discussion, and criticism was directed to some of the points to which Dr. Brackenbury draws attention. It was obvious that this would be the case, inasmuch as the difficulties to which Dr. Brackenbury alludes were mentioned in my address and are carefully considered in the report of the Ministry of National Service. It is by no means pleasing to study the results of the report, and some of our colleagues at Aylesbury were inclined to account for the results obtained in their own area by bringing forward the explanations suggested by Dr. Brackenbury. They drew attention to the fact that many men who were efficient and physically fit had gone or had been called up for military service during the years of the war preceding the date to which the report of the Ministry of National Service refers.

In my address I laid stress on the necessity of not drawing alarmist or even too depressing conclusions from the results shown during the years 1917-18. I drew attention to the way in which exaggerated opinions as to the "progressive physical deterioration" of the nation, freely expressed after the South African war, were reduced to their proper value by the common sense of the late Sir William Taylor and others who gave evidence before the Interdepartmental Committee of 1904. I also mentioned the very interesting fact that the necessity for seeing and for examining large numbers of diseased and physically unfit men tends to disorder judgement, and to suggest a low opinion of the fitness of the remainder of a population from which these unfit individuals have been segregated. This curious psychological influence, due partly to aversion and partly to sympathy, affects not only laymen but also medical men. But the results of the two and a half million examinations made by the medical men employed on the work, gathered and sifted by the Ministry of National Service, must be accepted as being as near as possible to the truth at the time. They are the most accurate figures we have and likely to have for long. The possibilities of error were fully considered by those who collected and collated the evidence. Under-estimation on one side was balanced as carefully as possible against over-estimation on the other. In addition, a certain amount of statistical evidence as to the physical condition of those who passed into the army in the earlier period of the war is available, and corroborates the conclusions given in the report.

There are one or two points to which Dr. Brackenbury's attention has, perhaps, not been sufficiently directed. It must be recollected that even up to the end of the war extensive protection was still being exerted in the case of men engaged in certain essential reserved occupations. Large numbers of these men were never disturbed, even to the extent of having to undergo medical examination, up to the end. But the examination of these men as they were called up for service from time to time, especially from such groups as agriculturists and miners, should have given the results of normal or better than normal sections of the population. These results should be expected to raise an unduly depressed average. Again, the young men were being examined continuously as they reached the age of military service. The results obtained from these examinations were as a whole good, and should certainly be expected to raise the average. It was after carefully balancing the results that the conclusions expressed in the report were reached. It appears to me, therefore, that the opinion of those concerned in drawing out the report is worthy of full weight: "It appears therefore legitimate to infer that any broad deductions we may draw from the grading facts and figures will lead us to conclusions which, if they err at all, will err on the side of overrating rather than underrating the physical condition of our manhood." (Cf. the Report, p. 5.) But even if it were found after discussion that the points raised by Dr. Brackenbury were of sufficient moment to modify in a favourable sense the results shown by the figures actually obtained, I believe that Dr. Brackenbury would be the last to uphold that the result could be declared to be satisfactory. If we take the index of fitness referred to as "Keith's Index" in the report—a figure which was found to be sufficiently correct to act as a useful guide—it will be noted that the fitness of a normal group of adults in this country may be fairly expected to reach the ratio expressed by the number 89.3 per cent. The result of the two and a half million examinations gave an index of 70.9 per cent., showing a deficit of 18.4 per cent. I fear that all the mitigating considerations urged by Dr. Brackenbury would still fail to bridge satisfactorily the chasm between the degree of unfitness actually found and the degree of fitness which we have reason to expect. It is to this great and pitiable deficit in fitness that I desired to draw attention in my address and to urge remedial measures, some of which Dr. Brackenbury draws attention to in his letter.

He rightly refers to a great gap in our information—namely, that we have no corresponding information about our women comparable to that given by the physical census of our men. It will be readily understood that the difficulties lying in the way of making a similar review in the case of women are greater than in the case of men. It may, however, be of interest to know that arrangements were made for the physical examination of women seeking admission to certain of the Women's Auxiliary Corps during

the war comparable to those made for men, so that the results might be collected and collated in the same manner. A certain amount of information was obtained as the result of the medical examination of over 60,000 women. I am sure, from what we do know, that it would not be wise to accept as near the truth that anything like a desirable or normal physical standard is attained by women throughout the country.

It may very well be the case, as Dr. Brackenbury suggests, that the future of the population, so far as breeding is concerned, depends more upon the fitness of the women than on the fitness of the men; but for our immediate purpose it seems that the most important factor in obtaining a higher degree of fitness in the future is the proper care both of the physical and the mental training of the children when they do arrive.

With reference to the whole series of examinations carried out by the Ministry of National Service, I would draw attention specially to the fact that the problem placed before the medical men concerned was not whether a man was fit for any form of service with the armed forces of the Crown, but it was to place the man in one or other of certain grades according to the degree of his physical fitness. The medical men were not asked to consider in the slightest degree any further or contingent question.

I would take the opportunity once more to urge the desirability of obtaining the fullest possible information regarding the fitness of our people from time to time. It seems to me that by this means we would obtain by far the most helpful and satisfactory guide to estimate the results of training and of the various plans for the improvement of conditions of life and of industry throughout the country.

I must not be led by Dr. Brackenbury to discuss with him questions involving the psychology of war and peace, or the advisability of accepting service from all classes of the community in times of emergency. I will not venture on a discussion as to whether Shakespeare was a Grade 1 man and what might have happened if he had been a soldier, nor whether it was well to employ the services of a man like Rupert Brooke in a military capacity. I would say, however, that men like these are the very men who would object to being left behind when their country requires their services in a good cause. Men of this type served the country well as soldiers, not only by their endurance and deeds of valour, but also by their mental gifts and powers of artistry, and by their example of willing service.—I am, etc.,

London, Sept. 25th. JAMES GALLOWAY.

THE EYE AND MOUTH IN SLEEP.

SIR,—While reading with great pleasure and interest the exceedingly instructive book by Dr. Frederic Wood Jones on *The Principles of Anatomy as seen in the Hand* (reviewed in your issue of August 21st), I came across a statement which appears to me to need qualification.

On pages 113 and 114 in Chapter XI, entitled "Position of Rest," the following statements are made:

> "The eye is kept open, and the mouth is kept closed by muscular effort. When rest is needed and muscular relaxation takes place in sleep, the upper eyelid droops and closes the eye, whereas the lower jaw drops and opens the mouth."

Without pretending to a knowledge of anatomy in any way comparable to that of Dr. Wood Jones, I am at liberty to contend that the physiological deductions quoted above do not accurately express nor explain the usual position of rest.

To begin with, the closing of the eyes during sleep is by no means wholly due to inhibition of the action of the muscles which raise the lids, but is completed by contraction of the orbicularis. In a condition of complete inhibition of all palpebral muscles the eyelid droops truly, but the eye is by no means closed. For example, it is well known that in death the eyes do not naturally close into the position of sleep. Also in complete facial paralysis and in advanced stages of exhaustion by illness closure is incomplete.

In dealing with the mouth, also, Dr. Jones has not expressed with any exactness the observed physiological fact. It is true that during sleep the lower jaw drops a little as a rule from the upper, so that the teeth are no longer in contact, but this movement is normally of small range and insufficient to cause parting of the lips, without which the mouth cannot be said to be open. In the absence of abnormal conditions of the nose and nasopharynx necessitating oral respiration, the most usual cause of an open mouth during sleep is over-extension of the neck or of the head upon the neck—that is, a faulty decubitus. Usually on going to sleep the head tends to drop a little forward.

I am writing this because, seeing the great and generally acknowledged importance to health and growth of normal nasal respiration, I feel that an erroneous impression given under the hand of so eminent an authority as Dr. Frederic Wood Jones has great potentialities for harm if allowed to pass unchallenged.—I am, etc.,

WM. SALISBURY-SHARPE, M.D., F.R.C.S.I.

London, W., Sept. 21st.

SCIENTIFIC RELATIONS WITH GERMANY.

SIR,—I venture with some diffidence to suggest a discussion in your columns of a question that may give rise to differences of opinion, but which has more than once been referred to in medical journals in this country—namely, that of the renewal of scientific relations with our recent enemies. The columns of the BRITISH MEDICAL JOURNAL, officially representative as it is of the profession in Great Britain and the Colonies, are surely the proper sphere in which to air these conflicting views.

It is nearly two years now since firing ceased on Armistice Day, and yet we are in danger of remaining indefinitely in the stage of "reprisals." Enemy subjects were excluded from the recent International Congress of Surgery, and, so far as I know, no steps are being taken to alter that decision or to admit them to any "international" meeting in the near future.

The *Presse Médicale* of August 25th, 1920, p. 1114, calls attention to an article in the *Deutsche medizinische Wochenschrift* of July 15th, 1920, p. 809, from which it quotes the following paragraph:

> We learn from some university circles that physicians of the countries with which we have been at war are expressing the desire to be allowed to attend German clinics. A general attitude should be adopted towards them. Certainly the conclusion of peace makes it possible to renew scientific relations between countries formerly at war; but this only applies to those of our recent adversaries who are really disposed to reconciliation. Frenchmen, Englishmen, Belgians, and Italians who have founded "international" societies excluding both German and Austro-German physicians, Frenchmen and Belgians who have erased the names of honorary German members from their societies cannot, obviously, enter into personal relations with us. The head of any German scientific institute who would consent to receive a citizen of these countries, so long as these resolutions remain in force, would gravely injure his personal dignity and *amour propre* as well as those of his nation. Physicians of enemy countries should at least have sufficient regard for the representatives of our science not to attempt any steps in the way of such a personal reconciliation.

It may be that it were well to leave to Time's gentle hand to heal the wounds that still gape and fester; but, Sir, it seems to me that it is not unworthy of our profession to do what we can even now, "with the hot blasts of hate still on our cheeks," to hasten the day when there shall be real peace and when the untimely deaths of war shall be no more.—I am, etc.,

A. A. WARDEN, M.D.Paris.

11, Avenue du Bois de Boulogne, Paris.

MORTALITY OF VENEREAL DISEASES.

SIR,—The question of the mortality resulting from venereal disease is a matter of special interest to medical women, for without doubt a very large proportion of such deaths occur either *in utero* or during infancy.

Very grave results might follow a minimizing of the mortality results of syphilis and gonorrhoea, and therefore the correspondence that has occurred in your columns between Mr. Charles Russ on the one side, in a position of isolation, and Sir James Crichton-Browne, Mr. C. F. Marshall, Dr. H. H. Sturge, Colonel E. T. Burke, Dr. Briscoe, and Mr. Wansey Bayly on the other, requires the careful and judicial consideration of medical women.

In summing up our opinions on this correspondence, we must consider both the evidence, the witnesses called, and

the authority and experience of the "plaintiff" and "defendants." There can be little doubt that the list headed by Sir James Crichton-Browne contains the names of persons whose experience gives their opinions authority; and the witnesses cited by them, Sir William Osler, Sir Arthur Newsholme, Gaucher, Runeberg and Audry, are certainly responsible and reliable witnesses. Mr. Russ apparently relies on the Registrar-General as his sole witness, and probably this witness would be the first to acknowledge that his evidence was certainly inconclusive.

Three letters have been contributed to this correspondence by Mr. Russ, but his arguments are unconvincing, and he frequently mistakes the repetition of an unsupported statement for a new contribution to the evidence. Gibes at "unscientific melodrama" and "dogmatic assertion" are not argument, and are apt to recoil on the head of the user of such weapons.

In the ante-natal clinic which are now an important part of every welfare centre we have increasing evidence of the appalling results of venereal disease upon the expectant mother and her unborn child. Anything which tends to lessen the gravity with which these tragic results are regarded is disastrous to the individual and to the nation alike. It is difficult to understand why Mr. Russ should be so anxious to disprove the malignancy of this ancient disease.

Our country needs all the power and skill of her sons and daughters if this monster is to be destroyed. The disease continues to spread wholesale disaster while we wrangle over issues of no real importance as compared with the pressing need for a united front against this enemy, which is not only undefeated after centuries of warfare, but is gaining ground.—I am, etc.,

London, W.1, Sept. 27th. JANE LORIMER HAWTHORNE.

VAGUS INHIBITION.

SIR,—I have just read Sir Clifford Allbutt's letter in your issue of August 14th last. Perhaps the following extract, supporting Sir Clifford's view that death may be due to vagus inhibition, may be of interest. Hilton Fagge, in a paper entitled, "On the Different Modes of Dying" (*Guy's Hospital Reports*, 1879, p. 352), writes:

> In cases of aneurysm of the aorta it is not uncommon for sudden death to occur without the autopsy revealing a rupture of the sac or any other definite change. In such cases the fibres of the left vagus nerve are commonly spread out over, and inseparably blended with, the walls of the aneurysm, and it seems very likely that this ought to be regarded as the cause of the arrest of the cardiac pulsations.

—I am, etc.,

London, Sept. 27th. W. HALE-WHITE.

TREATMENT OF CALCULI IMPACTED IN THE PELVIC PORTION OF THE URETER.

SIR,—Professor William Wright asks me what evidence I have of the existence of a sphincter at the lower end of the ureter, and from his research with the dead subject speculates upon the nature of the movement whereby urine is prevented from regurgitating from the bladder.

My evidence is based upon observation of the living subject. The cystoscope reveals the ureteric orifice contracted so long as there is no urine to expel; when urine is ready to be expelled it dilates, but no other than a slight wave of movement in the immediate vicinity of the ureteric orifice can be seen.

The point raised by so eminent an anatomist is of interest, for it affords an opportunity to co-ordinate the study of the dissecting-room with clinical practice. Professor Wright and Mr. Benians demonstrate that no sphincter exists at the vesical end of the ureter, yet cystoscopy witnesses that a different arrangement of muscle fibres, not anatomically a sphincter, is similar in its action. —I am, etc.,

London, W., Sept. 27th. CLIFFORD MORSON.

THE COLONIAL MEDICAL SERVICE.

SIR,—I venture to say that the whole of the members of the R.A.M.C. will be delighted to know of the probable reconstruction of the Colonial Medical Service. We know the hard work the Colonial Medical Service does, and will rejoice at their incorporation into a "service." May I suggest that where an officer of the R.A.M.C. has served in a colony and knows its climate and conditions, an open door should be left permitting transfer to the Colonial Medical Service, say, up to ten years' service? Our officers sometimes like certain colonies, and transfer should be possible, carrying pension rights.

The question of a "uniform" for evening dress purposes might be considered for the Colonial Medical Service. *Esprit de corps* gains even by such petty things.

I draw attention to the fact that medical officers sent to the Federated Malay States are officially sent out as "second class passengers." I regard this as a lamentable error on the part of the Colonial Office. It should be stopped forthwith. I wrote to the Secretary of State for the Colonies before the great war asking him to cancel such a stupid regulation, but I failed to move the Colonial Office. A young medical man going to the colonies needs to meet on board ship the best and most intelligent people, to learn all he can about the colony during the voyage. The most junior subaltern in the most unimportant military appointment would never be thus affronted by a stupid and injurious Colonial Office ruling. I wish the British Medical Association would address the Colonial Secretary on this matter.—I am, etc.,

London, S.W., Sept. 27th. GEORGE J. H. EVATT, M.D., Major-General, R.A.M.C.(ret.).

CADMIUM POISONING AND PLUMBISM.

SIR,—I am much obliged to you for drawing attention to my article on cadmium poisoning in spelter workers, in the EPITOME of September 18th, 1920, paragraph 268. The most important point in connexion with the subject is as to its truth or otherwise, for if it be true, then all the treatment in the past by means of iodides has been wrong.

Sir Thomas Oliver, in his book on lead poisoning, speaks approvingly of a method of treatment that I introduced a few years ago for the gastritis of spelter workers, which consists in the four-hourly administration of ¼-grain doses of calcium permanganate.

It is a very moot point whether iodides are of much value even in the treatment of plumbism, but if given to spelter workers suffering from gastritis they help to transform what little lead may be present into a soluble and easily diffused form, whereby the lead penetrates more thoroughly into the system and sets up an additional toxic condition.

The only satisfactory treatment for plumbism is prophylactic, but, unfortunately, this requires co-operation and forethought on the part of the workman for his own personal apart from his financial interests. Such qualities are barely compatible with the trend of the times, when so much has been done for the workman that he is almost justified in feeling that everything shall be done for him. All workmen do not come under this category, for there are many who have worked well and looked after themselves, with happy results; but not troubling anybody, nobody troubles about them.—I am, etc.,

Swansea, Sept. 19th. G. ARBOUR STEPHENS.

PUERPERAL SEPSIS.

SIR,—I heartily agree with my fellow practitioners that all that is known about the prevention of puerperal sepsis should be as widely diffused as possible. We all have our own opinions, but the great majority agree that we cannot afford to neglect the Listerian methods for prevention that have stood the test of time. In my limited experience I am convinced of one thing—that is, that it is absolutely necessary to suture even the smallest perineal laceration. When I commenced practice (twenty years ago) I found that only a few of the older practitioners sutured perineal lacerations unless very extensive. I was afraid of being considered clumsy in my manipulation and followed their example. I found that my patients were frequently having small rises of temperature, even though I was scrupulously careful about my hands and instruments. I then tried suturing even the smallest lacerations, and found that a rise of temperature was a comparatively rare event. I came to the conclusion that a good many patients must be infected after labour from open wounds of the perineum, either from the anal surface, which is always contaminated, or from "clean" rags, which are the usual diapers in

the country. My midwife also has learnt the advantage of having all lacerations sutured, and always sends for me after the birth for this purpose. This may seem a small thing to write about, but it may help to explain why sepsis only rarely follows extensive instrumental manipulation, as in these cases the lacerations are evident and are immediately attended to. We often arrive at a case when all is over, and may not take the trouble to look for lacerations, but if we do and attend to them we shall be well repaid.—I am, etc.,

Crumlin, co. Antrim, Sept. 27th. WM. HUNTER, M.B.

THE NATIONAL HOSPITAL FOR PARALYSED AND EPILEPTIC.

SIR,—Will you very kindly allow me to approach the medical profession through the medium of your columns, as there appears to be some misunderstanding in respect of the present functions of the National Hospital for the Paralysed and Epileptic?

A short time ago, for financial reasons, it was found necessary to close wards, but, with the exception of a comparatively small number of beds, this step was averted by help from King Edward's Hospital Fund. The out-patient department has never been affected, and is fully open as before. As a large number of our patients are sent to us by medical practitioners, it is important that they should be informed that the hospital is open for the reception of patients, both in the wards and the out-patient department.—I am, etc.,

GODFREY H. HAMILTON, Secretary,
National Hospital for the Paralysed and Epileptic.

London, W.C.1, Sept. 28th.

PRICE OF PETROL ON THE CONTINENT.

SIR,—I note Sir StClair Thomson's letter on this subject with much interest, in that the information on which I based my figures was derived from two sources—Paris and New York. The return from the latter was to the effect that a gallon of petrol in France was costing 2.28 dollars; thus confirming the information I had at that time from the French capital. That Sir StClair Thomson has been able to buy it at from 4s. 11½d. at Antwerp to a few pence over 5s. a gallon at Lille at present rates of exchange is welcome news, despite the fact that these figures represent increases respectively 6.25 and 6.75 fold on pre-war prices. I regret, too, that this does not alter the situation and prospects in regard to the world's oil industry.—I am, etc.,

September 27th. H. MASSAC BUIST.

Obituary.

SIR JOHN W. BYERS, M.A., M.D., M.A.O.,

Professor of Midwifery, Queen's University of Belfast.

It was with very deep regret that we announced last week the death of Sir John Byers, which took place on September 20th at his residence, Dreenagh House, Belfast. He had recently returned from a five weeks' holiday in Scotland, and was in excellent health and spirits; he was distressed on learning of the death of his close personal friend and colleague, Mr. Robert Campbell, F.R.C.S.Eng., of whose skill he had availed himself on more than one occasion for his own family. He attended the meeting of the board of management of the Royal Victoria Hospital on September 15th, and moved the vote of condolence in a feeling speech. Subsequently he motored home, and was observed to be ill on arriving at his own door; and the signs of a right hemiplegia with loss of speech and subsequent deepening unconsciousness pointed clearly to cerebral haemorrhage. He sank rapidly on the 19th and died the following evening.

John William Byers was the only child of the late Rev. John Byers, M.A., missionary to China, and of the late Mrs. Margaret Byers, LL.D., founder and principal of Victoria College, Belfast, distinguished for her efforts to promote the higher education of women. He was born in Shanghai in 1853, and so was in his 67th year. He was educated at the Royal Academical Institution, Belfast, and had a brilliant collegiate and university course in Queen's College and University, gaining a gold medal and first honours in his B.A. and M.A. degrees, and honours with his M.D. He studied also in Dublin and in London, where he formed a friendship with the late Sir Jonathan Hutchinson and others. Settling in Belfast, he was appointed to the Belfast Hospital for Sick Children; and in 1882 was appointed as gynaecologist to the new department of the old Royal Hospital, which he organized so successfully. In this he had at first only four beds; in the new Royal Victoria Hospital he left the department with a well-equipped large ward, small ward, operating theatre, and out-patient rooms for the assistant. He was on the active staff for thirty-seven years, a member of the building committee of the new hospital, chairman of the medical staff for three years, and finally, on reaching the age limit, was appointed consultant. His colleagues on his retirement presented him with a Chippendale silver salver containing their autographs. He was also one of the active medical staff to the Belfast Maternity Hospital; and evidence of his recent energy is forthcoming in a short series of consecutive Caesarean sections, all successful, and two successful operations for ruptured uterus during the last year.

Sir John Byers was examiner in obstetrics in the old Royal University of Ireland, and was appointed professor of midwifery and diseases of women in Queen's College. He was a member of the Central Midwives Board for Ireland, having been elected by the medical practitioners resident in Ireland. He was honorary president of the International Congress of Obstetrics and Gynaecology in 1896; vice-president of the Obstetrical Society of London from 1899 to 1901; president of the Ulster Medical Society in 1893–94; president of the North of Ireland Branch of the British Medical Association, 1900–1; president of the Belfast Branch of the Irish Medical Association, 1903–9; president of the Section of Obstetric Medicine and Gynaecology at the meeting of the British Medical Association in Cheltenham, 1901, and delivered the address in obstetrics when the Association held its annual meeting in Belfast in 1909; president of the Section of Physical Education and Training in Personal Hygiene at the International Congress on School Hygiene in London in 1907; president of the Conference on Hygiene of Childhood, in connexion with the Royal Sanitary Congress at Belfast in 1911, and president of the Belfast County Borough Medical Committee in 1912–13. He was one of the two representatives of Ulster on the Council of the British Medical Association, and in 1905, when the Irish Committee was constituted, he was unanimously elected chairman.

Sir John Byers had many and varied interests; amongst these he was a diligent student of the folklore and dialect of Ulster, and was busily engaged during the last few years in the preparation of a book on the subject; he was one of the referees for the province in connexion with the *Oxford Dialect Dictionary*; and nothing pleased him more than to get into conversation with some countryman from an out-of-the-way district and learn his feelings, beliefs, and speech. In 1894 a number of his friends presented him with his portrait in oils, together with a replica for his wife; the former was hung in the Examination Hall of the College. He was always in the forefront in all matters of public health, and showed himself a clear and convincing speaker and a keen debater; one always knew on which side he was in a controversy, and he was a loyal and staunch friend; the students will miss a stimulating influence in the school, and the profession a protagonist who stood for its welfare and high interests. The amount of work he got through was enormous, and the range of his contributions and his activities has become, one may say, proverbial. Although he could not stand shuffling or underhand meanness, and exposed them ruthlessly, yet he had a kind heart and was ever ready to help the young medical man in his struggles; his last act of paying tribute to the worth of a dead colleague was a fit ending to his labours.

He is survived by Lady Byers and three sons, with whom deep sympathy is felt.

LIEUT.-COLONEL JOHN LEWTAS, C.B.E., M.D.LOND., I.M.S. (ret.).

THE announcement of the death of Colonel Lewtas, on September 23rd, comes as a surprise to many of those associated with him during the later part of his active career in London.

Retired from the Indian Medical Service, in which he

had acquired much knowledge and experience as a military medical officer on the Frontier, and special experience as professor of ophthalmology in the Calcutta Medical College, he offered his services to the War Office at the commencement of the war. He was employed on recruiting duties at various stations in London and later on visits of inspection throughout the country. When the Ministry of National Service was reconstituted he was one of the War Office Medical Staff transferred to the new Ministry. For some time he was employed in the head office, and afterwards, until the close of the Ministry, as Commissioner of Medical Services in the Eastern Region.

From the early days of the war Colonel Lewtas took a very keen interest in the medical aspects of recruiting, and was at pains to study the methods employed in other countries, especially the medical recruiting problems presenting themselves to our medical colleagues in France. His experience of active military service in India, added to the knowledge acquired by study and observation in England, enabled him to render very special service when the Ministry had to build up a large medical organization in a short space of time during the third year of the war. The early medical instructions, especially those dealing with the physical grading of men, owed much of their value to Colonel Lewtas. His sound knowledge of the problems of eyesight and of vision was of great service.

Colonel Lewtas was an accomplished physician. His colleagues recollect with admiration how he was able, after a bout of hard work, to divert his attention to some abstruse problem of higher mathematics and commence again, refreshed, to consider a difficult question, probably involving political controversy, which at that time caused a good deal of anxiety. He was an example of the best type of military medical officer so frequently given us by the Indian Medical Service. Learned, experienced, wise, and always helpful, his loss is deplored by many of us who looked forward to years of his friendship in London.

WE regret to record the death, which took place at his home at Alexandra Park, Manchester, on September 24th, of Dr. ALEXANDER G. FRASER. Dr. Fraser was born in Aberdeen in 1846, and graduated M.A.Aberd. in 1867, M.B., C.M.Edin. in 1883, and M.D.Edin. in 1890. During his thirty-six years in practice in Manchester he gained the esteem of a wide circle of friends and patients. The first volume of his book, *Idylls of Life and Love*, dedicated to "My friends in the medical profession," was published in 1916; it was followed later by a second volume.

Universities and Colleges.

UNIVERSITY OF LONDON.

A UNIVERSITY SITE.

THE President of the Board of Education wrote on September 24th to the Vice-Chancellor of the University of London stating that the Government offer of the site at Bloomsbury, north of the British Museum, would only remain open until the next meeting of the senate of the university; that meeting will take place on October 20th. The site, it will be remembered, comprises 11½ acres; it is at present covered by houses, but the leases of many of them expire before 1924, of others in 1928, and of most of the remainder in 1939. The ground is offered as a site for the head quarters of the university, and for colleges and institutions connected with it, including in particular King's College. The removal of King's College to the new area would liberate the site it now occupies in the Strand; that site is very valuable, and the amount received from it would be a considerable set-off against the Government expenditure on the Bloomsbury site. The Government offer includes maintenance charges, but not the cost of the erection of the new buildings. Mr. H. A. L. Fisher, in his letter of September 24th, states specifically that the Government offer is not available for any alternative site in or near London; after careful consideration of the various sites suggested at one time or another, and review of all the circumstances, the Government has come to the definite conclusion that the site north of the British Museum is the most suitable, and the only one which it could feel justified in acquiring for offer to the university. Mr. Fisher goes on to speak of the desirability of having a university quarter, and says that the Bloomsbury site offers the greatest advantages for the creation of such a quarter. It is, he says, central, accessible from all parts of London, in a residential neighbourhood convenient for teachers and students, and adjoining the great national literary and archaeological collections; he also states that it is capable of expansion in the future, should the need arise—a point upon which many of the critics of the Government offer are not satisfied.

SCHOLARSHIPS.

The following scholarships have been awarded:

London Hospital Medical College.—Entrance scholarship in anatomy and physiology, open to students of the Universities of Oxford and Cambridge, to W. W. R. Brain, New College, Oxford.

St. Thomas's Hospital Medical School.—University scholarship (value £100) to C. V. Patrick (Rugby and Caius College, Cambridge).

UNIVERSITY COLLEGE.

An introductory public lecture to the courses of lectures on the history of science will be given by Sir William H. Bragg, F.R.S., on Thursday, October 7th, at 5 p.m. This lecture is open to the public without fee or ticket. The courses include one on the general history and development of science, by Dr. A. Wolf, and twelve lectures on the history of the biological and medical sciences from early time to the eighteenth century, by Dr. Charles Singer, on Tuesdays at 5.15 p.m., beginning October 12th.

The Services.

DEATHS IN THE SERVICES.

LIEUT.-COLONEL PERCY DE HAGA HAIG, Bengal Medical Service (retired), died on September 9th, aged 70, at Monte Carlo, where he had settled after his retirement. He was the son of the late William Haig, was educated at St. Bartholomew's, and took the M.R.C.S. and L.R.C.P.Lond. in 1873. Entering the I.M.S. on September 30th, 1875, he became surgeon-lieutenant-colonel in 1895, and retired on February 15th, 1901. He served in the second Afghan war of 1878–80, in the operations of the Peshawur Valley Field Force, and in the expedition to the Tonk frontier, receiving the medal; and in the Waziristan campaign on the North-West Frontier in 1894–95, when he was severely wounded in the action at Warra, and gained the Frontier medal with a clasp. His whole service was passed in military employment.

HONOURS.

THE following awards are announced for distinguished service in the field with the Waziristan Force, India:

Bar to D.S.O.

Captain Nilkanth Shriram Jatar, D.S.O., I.M.S., attached 2/76th Punjabis, Indian Army.

For gallantry near Kotkai, on 5th January, 1920, when, during a withdrawal under heavy fire, he rendered valuable assistance in bringing in wounded, and, whilst doing so, was himself severely wounded. (D.S.O. gazetted 4th June, 1917.)

Military Cross.

Temporary Lieutenant Ben Philip Athaide, I.M.S., attached 1/103rd Mahratta Light Infantry, Indian Army.

For gallantry at Palosina on the 19th December, 1919, when in charge of an outpost. He displayed great devotion in attending to the wounded under fire, and when the line was forced back he remained till almost surrounded by the enemy, and was the last to leave.

Temporary Captain Naval Maneckji Pestonji Dotivala, I.M.S., attached 2/5th Gurkha Rifles, Indian Army.

For most conspicuous gallantry in action at Sorarogha on 18th January, 1920, and at Makin on the 20th February, 1920. On both occasions he displayed the greatest gallantry and disregard for danger in his care of the wounded during the action. He set a very fine example to all.

A PROFESSOR of anaesthesia has been appointed at the University of Maryland Medical School.

OWING to the great reduction in size of the German army the Kaiser Wilhelm Academy, which has been an army medical college for many years, is no longer required for this purpose, and will be converted into an institution for training medical men in social medicine.

A DISCUSSION on the physics and chemistry of colloids and their bearing on industrial questions, arranged jointly by the Faraday Society and the Physical Society of London, will take place on Monday, October 25th, at the Institution of Mechanical Engineers, Storey's Gate, London, S.W. The discussion will be presided over by Sir W. H. Bragg, F.R.S., and Professor Svedberg of the University of Upsala, who will give a general survey of the subject before discussion is opened in its various branches. Non-members of the above societies may obtain tickets of admission from Mr. F. S. Spiers, 10, Essex Street, London, W.C.2.

Medical News.

THE usual series of monthly scientific demonstrations will be held during the forthcoming winter at Newcastle-on-Tyne, under the auspices of the North of England Branch of the British Medical Association. These demonstrations have had very considerable success; they were held for many years before the war, and again during last winter. The syllabus of the course is being circulated to all practitioners in the area of the North of England Branch, whether members of the Association or not. The honorary scientific secretary is Mr. R. J. Willan, M.V.O., O.B.E., 6, Kensington Terrace, Newcastle-on-Tyne.

THE new session of the Hunterian Society will open on Wednesday, October 13th, at 9 p.m., when Sir George Newman will deliver the first Hunterian lecture on "The Ministry of Health as an instrument in preventive medicine." The meeting will be held at Sion College, Victoria Embankment, close to Blackfriars Bridge, and all members of the medical profession are invited. We are asked to draw attention to this change of address. Subsequent meetings will be held there on the second and fourth Wednesdays of the month throughout the session. Particulars may be obtained from the honorary secretaries, Dr. Mackenzie Wallis, 24, Upper Berkeley Street, W.1, and Mr. M. W. B. Oliver, 128, Harley Street, W.1.

THE distribution of prizes at Charing Cross Hospital Medical School will take place on Monday, October 4th, at 3.30 o'clock in the Out-patients' Hall, and will be followed by a reception.

IN the Medical Unit of the London Hospital a course of lectures will be given during the winter session on Tuesdays and Thursdays, commencing October 5th, by Dr. John Parkinson, Dr. O. Leyton, Dr. George Riddoch, and Dr. A. W. M. Ellis. The lectures are open to senior students and post-graduates of the London Hospital and other medical schools; they will be given in the clinical theatre at 4 p.m.

THE dinner of the London School of Tropical Medicine will be held at the Royal Automobile Club, Pall Mall, on Tuesday, October 12th, under the presidency of Captain A. W. Clarke, C.B.E., Deputy Chairman of the Seamen's Hospital Society. The school will be glad to hear from past students who may desire to be present.

THE tenth London Medical Exhibition will be held in the Central Hall, Prince's Street, Westminster, S.W., from Monday, October 4th, to Friday, October 8th. It will be open from 12 noon to 6.30 p.m. each day. Tickets are issued to the medical profession only, and the public are not admitted.

A COURSE of twelve demonstrations to medical practitioners on the management and feeding of infants and young children will be given by Dr. Eric Pritchard at the St. Marylebone General Dispensary, 77, Welbeck Street, W., on Tuesdays and Thursdays, commencing Tuesday, October 5th. Visits will be paid on Saturday afternoons to the Nursery Training School, Golders Green, to see the methods there employed in dealing with infants. The fee for the course is two guineas.

A SERIES of post-graduate lectures and demonstrations will be held at the Salford Royal Hospital and Ancoats Hospital, Manchester, through the winter. The course is free, and commences on Thursday, October 7th. The first lecture will be given by Dr. Langley at Ancoats Hospital, on "Prognosis in aortic disease." Thereafter a lecture will be given every Thursday at the two hospitals alternately.

THE usual weekly lecture to post-graduates at the National Hospital for Diseases of the Heart, Westmoreland Street, W.1, will be resumed on Mondays at 5.30 p.m., commencing Monday, October 11th. Admission to the lectures is free to medical practitioners on presentation of their cards.

THE weekly free lectures to medical practitioners will be resumed at the Hospital for Sick Children, Great Ormond Street, London, W.C.1, on Thursdays, at 4 p.m., from October to December, beginning October 7th.

THE opening of the seventy-ninth session of the School of Pharmacy of the Pharmaceutical Society of Great Britain will be held on Wednesday, October 6th, at three o'clock, when the Pereira Medal will be presented, and the inaugural sessional address will be delivered by Mr. E. Saville Peck, M.A., President of the Pharmaceutical Conference.

THE post-graduate course at the National Hospital for the Paralysed and Epileptic, Queen Square, W.C., will be resumed on Monday, October 4th.

AT a meeting of the Society for the Study of Inebriety, in the Rooms of the Medical Society of London, 11, Chandos Street, Cavendish Square, W.1, on Tuesday, October 12th, at 4 p.m., Dr. James A. Davidson will open a discussion on special clinics for inebriates.

THE following lectures and practical courses of instruction for a diploma in psychological medicine have been arranged at the Maudsley Hospital, Denmark Hill, S.E. Sir F. W. Mott will give six lectures with demonstrations on "The pathology of mental diseases, including brain syphilis, its symptomatology and treatment," on Mondays, October 4th, 11th, and 18th, at 2.30 p.m., and Fridays, October 8th, 15th, and 22nd, at 4 p.m. Dr. C. Hubert Bond will give twelve lectures on "The diagnosis, prognosis, and treatment of mental diseases," on Fridays during October, November, and December, at 2.30 p.m. Dr. Bernard Hart will give six lectures on "The psychoneuroses," on Mondays during October, and on November 1st and 8th, at 5 p.m. Sir Bryan Donkin will give two lectures on "Mental defect and crime," on Mondays, October 25th and November 1st, at 2.30 p.m.; and Dr. F. C. Shrubsall six lectures, with demonstrations of cases, on "The practical aspect of mental deficiency," on Wednesdays during October, and on November 3rd and 10th.

THE inaugural meeting of the London Dermatological Society will be held at St. John's Hospital, 49, Leicester Square, at 5 o'clock on Tuesday, October 19th. Dr. Prosser White, physician to the Royal Albert Edward Infirmary, Wigan, will preside, and the address will be given by Sir William Collins, K.C.V.O., M.D. Members of the profession are invited to attend.

MESSRS. J. AND A. CHURCHILL announce for early publication an illustrated textbook on preventive medicine by Professor R. T. Hewlett and Dr. A. T. Nankivell.

Letters, Notes, and Answers.

As, owing to printing difficulties, the JOURNAL *must be sent to press earlier than hitherto, it is essential that communications intended for the current issue should be received by the first post on Tuesday, and lengthy documents on Monday.*

IN order to avoid delay, it is particularly requested that ALL letters on the editorial business of the JOURNAL be addressed to the Editor at the Office of the JOURNAL.

THE postal address of the BRITISH MEDICAL ASSOCIATION and BRITISH MEDICAL JOURNAL is 429, Strand, London, W.C.2. The telegraphic addresses are:

1. EDITOR of the BRITISH MEDICAL JOURNAL, *Aitiology, Westrand, London;* telephone, 2631, Gerrard.
2. FINANCIAL SECRETARY AND BUSINESS MANAGER (Advertisements, etc.), *Articulate, Westrand, London;* telephone, 2630, Gerrard.
3. MEDICAL SECRETARY, *Medisecra, Westrand, London;* telephone, 2634, Gerrard. The address of the Irish Office of the British Medical Association is 16, South Frederick Street, Dublin (telegrams: *Bacillus, Dublin;* telephone, 4737, Dublin), and of the Scottish Office, 6, Rutland Square, Edinburgh (telegrams: *Associate, Edinburgh;* telephone, 4361, Central).

QUERIES AND ANSWERS.

DR. FRANK GRENIER (Senior Physician General Hospital, Colombo) writes in reply to "Parent" (September 18th, p. 456) that there is no malaria in the town of Kandy, and the climate is quite suitable for the case mentioned.

"P. W. M." desires information on the subject of South Africa as a resort for the tuberculous patient. He wishes to know particularly of places at a fair altitude, with a bracing climate without dust storms, where a man might obtain light outdoor occupation and not be deprived of all social amenities.

LIP READING.

DR. RENDLE (145, Sandgate Road, Folkestone) writes: A middle-aged man with increasing deafness has been recommended to learn "lip reading." I should be grateful for information whether the acquisition of the art is very difficult, and where the necessary instruction may be obtained in or within the neighbourhood of London.

*** The acquisition of the art of lip reading is not usually difficult for anyone whose deafness is considerable and who has good sight and fair mental alertness. There are numerous teachers in and about London; inquiries may be directed to the National Association for the Oral Instruction of the Deaf, 11, Fitzroy Square, W.1, of which Mr. G. Sibley Haycock is the principal.

INCOME TAX.

"C. S.," a newly retired colonial surgeon, inquires whether any deductions are allowed on income derived solely from pension.

*** There are presumably no expenses which can be deducted, and the only deductions, therefore, are the statutory allowances for self and wife, children, dependent relatives, and life assurances, so far as they are applicable.

"DOUBTFUL" inquires whether he can include in his professional expenses the premiums on a sickness and accident policy.

*** Such premiums do not constitute professional expenses; they have reference to the individual practitioner, but are not necessary to the carrying on of his work. In so far as the payment relates to the risk of death by accident, it may be claimed for as a payment on a life assurance policy. As a corollary it follows that benefits received under the policy are not assessable to income tax.

"G. P." inquires whether, for assessment of income tax, it is now allowable for each member of a partnership to be assessed separately on his share of the partnership profits.

*** No; the partnership profits must be assessed as a whole. The recent Royal Commission on the Income Tax recommended a change in the statute law to permit of the separate assessment of each partner, but so far only one section of the general recommendations has been dealt with—in the Finance Act, 1920. It is understood that a Government bill will be introduced into Parliament during the autumn session for the purpose of giving statutory effect to other sections of the Commission's report, and possibly the point in question will be dealt with in that bill. In that event the change would presumably operate from 1920-21 onwards.

"S. J." bought a 9-h.p. Renault in 1914 for £230 and sold it for £200, buying a Ford in 1920 for £327. The inspector of taxes agrees to allow the net cost (£327 – £200 = £127) "if the cars are of the same make."

*** The make of car can have nothing to do with the merits of the question, which is whether, and if so to what extent, the £127 represented expenditure on improvement. The test question seems to be, What was the cost price of a 9-h.p. Renault car—or of a similar car—in 1920 when the Ford was purchased? If it was £327 or more, then our correspondent is entitled to deduct the £127; if, for instance, it was £300, then the deductible amount would be £100, and so on. In other words, the current price of a 9-h.p. Renault car is a sort of standard, and replacement expenditure is allowable so long as the new car does not cost more than a 9-h.p. Renault would at the same date.

"W. M. G." has left England, and is now residing in France; he inquires as to the effect on his liability to income tax in this country.

*** He is liable to tax on his three months' earnings in this country; the provision as to exemption in favour of temporary residents not being in the country for six months in the financial year applies only to income arising outside the United Kingdom. His colonial pension is apparently exempt from income tax so long as it is not received in this country. New arrangements come into force this year with regard to income arising here, and paid to British subjects resident abroad, under deduction of income tax. The essence of the arrangement is that any "relief" given by the Acts is divided proportionately between the liable and non-liable incomes. We suggest that our correspondent should apply to the Repayments Branch, Somerset House, W.C., next March for a copy of the appropriate form of claim.

"G. C. B. C." inquires as to the admissibility for income tax purposes of the payments made to a locumtenent during the absence of the practitioner on holiday.

*** Our experience is that inspectors frequently admit a claim to such expenses when incurred on account of sickness but refuse them when paid to provide a holiday. We confess that the logical distinction escapes us; prevention is better than cure and serves the same general purpose, which is the maintenance of the practitioner's professional ability at a proper normal level. Presumably, if a practitioner employs an assistant, he is allowed to deduct his remuneration, whether it is incurred of necessity or to provide leisure for the owner of the practice, and the payment of a locumtenent appears to us to be on the same footing. There seems, therefore, to be good ground for "G. C. B. C.'s" opinion that he can carry his point before the local commissioners, and it would certainly be useful to have an authoritative opinion on the question. It may be suggested, however, that it might be possible to elicit from the authorities at Somerset House what is the official view of the central department; it might, for instance, be possible to obtain a statement as to whether they would acquiesce in the local commissioners' decision in the event of it being adverse to the inspector's contention. If our correspondent takes this course of action we should be glad to learn the result.

LETTERS, NOTES, ETC.

TENNIS ELBOW.

DR. E. OLIVER ASHE, F.R.C.S., Senior Surgeon, Kimberley Hospital, South Africa, writes, in answer to Dr. Havelock's query in the JOURNAL of July 31st, 1920, regarding descriptions of this injury: The best account of epicondylitis, or tennis elbow, is that by P. Cones in the *Boston Medical and Surgical Journal*, March 26th, p. 461, which was republished in the *Medical Review* in 1914 or 1915. I have the article before me at present, but cannot give the year of its original appearance or the exact date of the *Medical Review's* reprint. Having the bad luck to experience this disability in my own person about the time of the article's appearance, I can vouch for its accuracy. I was much struck by its emphasis of the facts that the external condyle is affected; that the pain may come on hours after the injury; that putting on a coat or gripping the hand firmly were very painful; that the proper adjective for the pain on pressure at the right spot was "exquisite," and that the pain took a long time—weeks—to disappear. In my case the cause was wrestling with a bad-starting motor car. This was at 3 p.m., and I felt no pain whatever until I got out of bed next morning. It was fully eight weeks before the elbow was comfortable, and the only treatment that gave any relief was antiphlogistine constantly applied.

A TEXTBOOK AS AN INDEX.

DR. ARTHUR G. WILKINS, Senior Medical Inspector, Stafford, writes with reference to the article "On Getting Rusty" in our last issue: As one who has spent just half his professional life in country practice, may I point out that the simplest way of keeping a "textbook as an index" is to have such books as *Taylor's Medicine* interleaved with alternate blank pages and rebound? I have done this for twenty-five years, and thus have my books not only kept up to date, by references to current literature, but a brief note of every rare case I have ever seen.

A HOSPITAL TRADE UNION.

A SOVIET missionary delegation, consisting of fifteen persons, recently reached Hamburg, and two of the delegates were allowed to go to Berlin to address meetings arranged by the Communist party. *The Times* correspondent in Berlin reports that Lossovsky, one of the delegates, explained the difficulties and backwardness of the trade union system in Soviet Russia. It was not at present possible to form a union for each trade, and the various workmen engaged in any one large factory were enrolled under the union to which the majority belonged. For example, in textile factories the metal workers and engineers were obliged to join the textile workers' union. They had protested, but their protests had been "broken." Lossovsky poured scorn, the correspondent continues, on the Petrograd doctors, who, he explained, had so far debased their high calling as to object to being enrolled in the union of the washerwomen of their hospitals, as being the most numerous.

VACANCIES.

NOTIFICATIONS of offices vacant in universities, medical colleges, and of vacant resident and other appointments at hospitals, will be found at pages 34, 37, 38, 39, 40, 41, and 42 of our advertisement columns, and advertisements as to partnerships, assistantships, and locum tenencies at pages 35, 36, and 37.

SCALE OF CHARGES FOR ADVERTISEMENTS IN THE BRITISH MEDICAL JOURNAL.

	£	s.	d.
Six lines and under	0	7	6
Each additional line...	0	1	3
Whole single column	6	0	0
Whole page	16	0	0

An average line contains six words.

All remittances by Post Office Orders must be made payable to the British Medical Association at the General Post Office, London. No responsibility will be accepted for any such remittance not so safeguarded.

Advertisements should be delivered, addressed to the Manager, 429, Strand, London, not later than the first post on Tuesday morning preceding publication, and, if not paid for at the time, should be accompanied by a reference.

NOTE.—It is against the rules of the Post Office to receive *poste restante* letters addressed either in initials or numbers.